MORPHOTAXONOMICAL AND ECOLOGICAL STUDIES OF THE HELMINTH PARASITES IN CERTAIN AMNIOTES

A
Thesis
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in
Zoology

Under
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गुरुर्ब्रह्मा गुरुर्विष्णु र्गुरुर्देवो महेश्वरः
गुरुः साक्षात् परं ब्रह्म तस्मै श्रीगुरवे नमः

Dedicated to
My Parents

(Late)Sri Amar Nath Srivastava

(Late) Smt. Ganga Devi

ॐ भूर्भुवः स्वः तत्सवितुर्वरेण्यं भर्गो
देवस्य धीमहि धियो यो नः प्रचोदयात्

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Supervisor's Certificate

This is to certify that the thesis entitled "**MORPHOTAXONOMICAL AND ECOLOGICAL STUDIES OF THE HELMINTH PARASITES IN CERTAIN AMNIOTES**" embodies the original research work of Sri Rajendra Nath Srivastava, M.Sc.(Zoology). The candidate has worked under my supervision for the prescribed period and has put in the required minimum attendance.

The thesis has not been submitted for any degree to any other university.

Jhansi

Date 11.08.2003

(Dr.A.K. Srivastav)

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INTRODUCTION

The vertebrates of all classes- viz. Pisces, Amphibia, Reptilia, Aves and Mammalia are parasitized by many helminth parasites. The common helminth parasites are cestodes, trematodes, nematodes and acanthocephala.

Most of the vertebrates like fishes, birds and mammals have food value for human beings, of which fishes constitute an important food for large section of population in India. The government is making all efforts to increase the yield of disease free fishes from ponds, lakes, rivers, oceans etc. Similarly, the poultry and ducks provide rich flesh and eggs for human consumption. The amphibians especially frogs are significant as frog legs are an export item. Reptiles like common house lizards play an important role as predator of a number of harmful insects, which reach our household and harm us. Similarly, the mammals like common house rats are very important pests of stored grains.

Helminths are mostly endoparasitic in different parts of alimentary canal of vertebrate hosts like stomach, small intestine, large intestine, liver, gall bladder, urinary bladder, eye and brain etc. They harm the human beings and other domestic animals by secreting toxins and causing diseases, commonly known as **helminthiasis** which is the most widespread infesting much higher

population of the world. The adult or larval forms or both may be pathogenic. They cause anemia, diarrhoea, eosinophilia, vomiting, headache, dysentry, fever, paralysis, urticaria and allergies etc. Hence the ecological studies of the helminth parasites which affect the health of vertebrate hosts are of paramount importance.

In the present thesis entitled "Morphotaxonomical and ecological studies of the helminth parasites in certain amniotes" the morphotaxonomic work has been restricted to some cestode species of family Davaineidae, Führmann, 1907 infesting the bird hosts only.

During the course of investigation the amniote host examined were the common wall lizard, *Hemidactylus flaviviridis* (Ruppel), the domestic fowl, *Gallus gallus* (Linnaeus) and the common rat, *Rattus rattus* (Linnaeus) for ecological studies of helminth parasites mainly from Jhansi and its adjoining areas for two successive years.

The present thesis deals with one new genus (published work), five new species and two redescriptions of Davaineid cestodes in morphotaxonomical studies. The prevalence, mean intensity and relative density of different helminth parasites of the amniote hosts have been described monthwise, seasonwise and on annual basis in relation to the sex of host and one published

work on ecology entitled " An ecological study of the prevalence, mean intensity and relative density of cestode infection in relation to the sex of the host in the pigeon, *Columba livia* (Gmelin) in Allahabad.

HISTORICAL

Quite a number of workers have contributed the knowledge of cestode taxonomy from South – East Asia. Southwell was the earliest and the pioneer worker in the field of cestode taxonomy. Southwell's contribution has been classical. His other important contributions are *Paradilepis kempi* (1921), *Dicranotaenia annandalei* (1922), *Raillietina (R.) fuhrmanni* (1922), *Raillietina (S.) centropi* (1922), *Spiniglans microsoma* (1922), *Parvirostrum magnisomum* (1930), *Raillietina (F.) korkei* (1930), *Raillietina (R.) maplestonei* (1930). The most significant contribution of Southwell is Cestoda vol. I and II in Fauna of British India including Ceylon and Burma series.

Meggitt has contributed a number of species from this region especially, Burma. His important contributions are *Cotugnia fastigata* (1920), *Mathevotaenia crinacei* (1920), *Hottuynia linstowi* (1921), *Cricetomys gambianum* (1921), *Cotugnia cuneata* var. *nervosa* (1924), *Cotugnia tenuis* (1924), *Mathevotaenia amphisbeteta* (1924), *Raillietina (R.) parviuncinata* (1924, with Saw), *Raillietina (R.) torquata* (1924), *Spirometra reptans* (1924), *Cotugnia seni* (1926), *Paricterotaenia barbara* (1926), *Paricterotaenia innominata* (1926), *Paricterotaenia*

magnicirrosa (1926), *Raillietina (F.) birmanica* (1926), *Raillietina (F.) pseudoechinobothrida* (1926), *Raillietina (P.) facilis* (1926), *Raillietina (P.) reynoldsae* (1926), *Raillietina (R.) flaccida* (1926), *Staphylepis rustica* (1926), *Amoebotaenia frigida* (1927), *Anomotaenia dubia* (1927), *Anomotaenia fortunata* (1927), *Armadoskrjabinia magniuncinata* (1927), *Atriotaenia figurata* (1927), *Bertiella fallax* (1927), *Chitinorecta agnosta* (1927), *Choanotaenia aegyptica* (1927), *Cotugnia fleari* (1927), *Cotugnia polycantha* var. *paucimusculosus* (1927), *Deltokeras ornitheios* (1927), *Diorchis longicirrosus* (1927), *Echinocotyle birmanica* (1927), *Hispaniolepis falsata* (1927), *Hymenolepis fanatica* (1927), *Hymenolepis fructicosa* (1927), *Hymenolepis fructifera* (1927), *Hymenolepis minutissima* (1927), *Joyeuxiella aegyptica* (1927), *Killigrewia frivola* (1927), *Killigrewia pamelae* (1927), *Liga facilis* (1927), *Microsomacanthus falcatus* (1927), *Microsomacanthus innominatus* (1927), *Nadejdolepis magnisaccis* (1927), *Oschmarenia incognita* (1927), *Paradilepis ficticia* (1927), *Paricterotaenia falsificata* (1927), *Pentorchis arkeios* (1927), *Raillietina (R.) baeri* (1927, with Subramanian) *Raillietina (R.) famosa* (1927), *Raillietina (R.) flabralis* (1927), *Raillietina (R.) fluxa* (1927, with Subramanian), *Raillietina (R.) funebris* (1927, with

Subramanian), *Raillietina (R.) indica* (1927, with Subramanian), *Raillietina (S.) fatalis* (1927, with Subramanian), *Stayphylocystis solitaria* (1927), *Thysanotaenia incognita* (1927), *Abortilepis fidelis* (1928), *Biuterina fallax* (1928), *Hymenolepis fungosa* (1928), *Abortilepis floreata* (1930), *Hymenolepis flaminata* (1930), *Cotugnia fila* (1931), *Mesocestoides tenuis* (1931), *Raillietina (P.) fecunda* (1931), *Raillietina (R.) flaminata* (1931), *Raillietina (R.) fragilis* (1931), *Raillietina* (R.) *pseudocyrtus* (1931), *Slossia crociduriana* (1931), *Bancroftiella forna* (1933), *Cladotaenia fania* (1933), *Cyclorchida foteria* (1933), *Dendrouterina fovea* (1933), *Dioecocestus feviata* (1933), *Hymenolepis finta* (1933), *Hymenolepis fona* (1933), *Hymenolepis foveata* (1933), *Hymenosphenacanthus fimula* (1933), *Hymenosphenacanthus fista* (1933), *Mayhewia filta* (1933), *Metroliasthes fulvida* (1933), *Passerilepis fola* (1933), *Raillietina (P.) fulvia* (1933).

Woodland (1927,1928,1929 and 1935) described many species of cestodes from birds and mammals of India. The important ones are *Avitellina chalmersi* (1927), *Avitellina goughi* (1927), *Avitellina lahorea* (1927), *Avitellina sudanea* (1927), *Mesocestoides elongatus* (1928),

Hymenolepis phalacrocorax (1929), *Malika oedicriemus* (1929), *Avitellina sandgroundi.* (1935)

Another foremost Indian devoted to the study of cestodes was Moghe. His important contributions from avian and mammalian hosts comprises *Panuwa chandleri* (1925), *Raillietina (R.) nagpurensis* (1925), *Raillietina (R.) quadritesticulata* (1925), *Southwellia gallinarum* (1925), *Baeria orbiuterina* (1933), *Echinocotyle oweni* (1933), *Ophryocotyloides meggitti* (1933), *Unciunia acapillicirrosa* (1933), *Ophryocotyloides monacanthis* (1934, with Inamdar), *Paruterina septotesticulata* (1934, with Inamdar), *Raillietina (P.) duosyntesticulata* (1934, with Inamdar), *Raillietina (P.) molpastina* (1934, with Inamdar). He erected three new genera viz. *Megalacanthus* (1925), *Southwellia* (1925) and Baeria (1933).

Burt's contributions mainly from Sri Lanka are *Angularella magniuncinata* (1938), *Angularella minutiuncinata* (1938), *Notopentorchis collocaliae* (1938), *Pseudangularia thompsoni* (1938), *Pseudangularia triplacantha* (1938), *Pseudochoanotaenia collocaliae* (1938), *Vitta magniuncinata* (1938), *Vitta minutiuncinata* (1938), *Infula burhini* (1939), *Paronia biuterina* (1939), *Paronia calcauterina* (1939),

Paronia coryllidis (1939), *Amoebotaenia setosa* (1940), *Choanotaenia dispar* (1940), *Choanotaenia magnihamata* (1940), *Cotugnia magna* (1940), *Cotugnia polytelidis* (1940), *Kowalewskiella glareolae* (1940), *Kowalewskiella stagnatilidis* (1940), *Malika himantopodis* (1940), *Malika kolawewaensis* (1940), *Malika zeylanica* (1940), *Microsomacanthus childi* (1940), *Onderstepoortia burhini* (1940), *Onderstepoortia lobipulviae* (1940), *Panuwa lobivanelli* (1940), *Paricterotaenia tringae* (1940), *Parvitaenia ardeolae* (1940), *Raillietina (S.) caprimulgi* (1940), *Dicranotaenia ellisoni* (1944), *Dicranotaenia uragahaensis* (1944), *Krimi chrysocolaptis* (1944), *Passerilepis septemsororum* (1944), *Charadrinus leschenaulli* (1969), *Hymenolepis mahonae* (1971), *Biporouterina psittaculae* (1973) and *Kowalewskiella susanae* (1974). Burt erected following new genera viz. *Pseudoangularia* (1938), *Pseudochoanotaenia* (1938), *Notopentorchis* (1938), *Vitta* (1938), *Infula* (1939), *Panuwa* (1940), *Krimi* (1944) and *Biporouterina* (1973). Some of Burt's species have been reported from India also.

Johri, L.N. has done extensive work on the cestodes of India and Burma. His main contributions are *Paruterina meggitti* (1931), *Raillietina (R.) perplexa* (1933),

Cotugnia govinda (1934), *Cotugnia intermedia* (1934), *Cotugnia januaria* (1934), *Cotugnia noctua* (1934), *Eugonodaeum ganjeum* (1934), *Eugonodaeum testifrontosa* (1934), *Gidhaia indica* (1934), *Oligorchis hieraticos* (1934), *Pseudoligorchis magnireceptaculatus* (1934), *Raillietina (R.) polychalix* (1934), *Raillietina (S.) kakia* (1934), *Raillietina (R.) penetrans* var. *nova* (1934), *Haploparaxis kamayuta* (1935), *Cotugnia longicirrosa* (1939), *Diorchis alvedea* (1939), *Diorchis chaleophapsi* (1939) *Diorchis lintoni* (1939), *Raillietina (P.) symonsii* (1939), *Microsmacanthus gyogonka* (1941), *Oligorchis burmanensis* (1951), *Eugonodaeum bybralis* (1951), *Thaparea magnivesicula* (1953), *Multiceps smythi* (1957), *Hymenolepis jasuta* (1960), *Hymenolepis jerralta* (1960), *Hymenolepis longiovata* (1962), *Killigrewia indica* (1962). Johri established two genera viz. *Gidhaia* (1934) and *Thaparea* (1953).

The new species which have been described by Inamdar from various parts of India are *Malika pittae* (1933), *Ophryocotyloides meggitti* (1933), *Choanotaenia gondwana* (1934), *Hymenolepis moghensis* (1934), *Hymenolepis victoriata* (1934), *Similuncinus totani ochropodis* (1934), *Shipleya ferrani* (1942), *Ophryocotyloides bhaleroi* (1944).

Sharma (1943) described a number of new species from Nepal. His important contributions are *Dicranotaenia apicaris, Hispaniolepis kaiseris, Hymenosphenacanthus rangoonica, Microsomacanthus jamunicus, Nepalesia jeodhii, Raillietina (F.) nepalis, Raillietina (P.) parbata, Raillietina (R) chilmei, Raillietina (R.) kantipura, Raillietina (R.) nripendra, Raillietina (S.) dhuncheta, Staphylepis infrequens* and *Vampirolepidoides krishna*. Sharma erected a new genus, *Nepalesia*.

Singh, K.S. has done extensive work on the morphology and taxonomy of cestodes from birds and mammals of India. His important contributions are *Angularella swifti* (1952), *Anoncotaenia gaugi* (1952), *Aploparaksis tandani* (1952), *Aporina percnopteri* (1952), *Choanotaenia hypolewia* (1952), *Cotugnia dayali* (1952), *Dilepis ardeolae* (1952), *Diorchis tilori* (1952), *Echinocotyle hypoleuei* (1952), *Echinocotyle minutissima* (1952), *Haploparaxis tandani* (1952), *Hymenolepis ababili* (1952), *Hymenolepis crecca* (1952), *Hymenolepis gaugi* (1952), *Hymenolepis magna* (1952), *Hymenolepis makundi* (1952), *Lapwingia reticulosa* (1952), *Neoangularia ababili* (1952), *Neoliga diplacantha* (1952), *Notopentorchis micropus* (1952),

Paricterotaenia milvi (1952), Progynotaenia longicirrata (1952), Vitta swifti (1952), *Hymenolepis bahli* (1958), *Indotaenia indica* (1962), *Ivritaenia mukteswarensis* (1962), *Ophryocotyloides makundi* (1962), *Ophryocotyloides picuri* (1962), *Raillietina (R.) thapari* (1963), *Anoncotaenia indica* (1964), *Biuterina coracii* (1964), *Biuterina dicruri* (1964), *Choanotaenia tandani* (1964), *Ophryocotyle indicus* (1964), *Panuwa stylicirrosa* (1964), *Dilepis kumaunensis* (1962 with Tandon, B.K.) and *Mayhewia levinei* (1963, with Tandon, B.K.), *Ophryocotyloides dasi* (1964, with Tandon, B.K.). Apart from the new species mentioned above Singh redescribed a number of old species as well. His new genera include *Indotaenia, Ivritaenia, Lapwingia, Neoangularia* and *Neoliga.*

Singh, K. P. described *Echinorhynchotaenia lucknowensis* (1956), *Choanotaenia aurantia* (1958), *Diorchis gigantocirrosa* (1959), *Anomotaenia oligorhyncha* (1960), *Biuterina meggitti* (1960), *Hymenolepis smythi* (1960), *Progynotaenia leucura* (1960), *Chettusiana indiana* (1961), *Ophryocotyoloides haemacephala* (1961), *Panuwa caballeroi* (1960, with Singh, K.S.), *Panuwa leucura* (1960, with Singh, K.S.) and *Panuwa vogeae* (1960, with Singh, K.S.).

The important contributions of Johri, G.N. are *Hymenolepis minimedius* (1959), *Infula indica* (1959), *Dilepis balacea* (1960), *Hymenolepis ciconia* (1960), *Hymenolepis gracea* (1960), *Hymenolepis tanakpuria* (1960), *Cloacotaenia* (Syn Lallum Johri, 1960), Spassky and Spasskaja(1968), *Neoligorchis alternatus* (1960) and *Progynotaenia indica* (1963). He erected a new genus *Neoligorchis*.

Srivastava, V.C. has described *Killigrewia allahabadi* (Syn. *Columbia allahabadi,* 1965 with Capoor), *Amoebotaenia gallusiana* (1979), *Raillietina (P.) capoori* (1980, with Sawada), *Echinocotyle singhi* (1980, with Pande), *Rhabdometra agrawali* (1984, with Pande), *Krimi simhai* (1984, with Tewari) and *Nadejdolepis umashankari* (1987, with Srivastava).

Capoor, V.N. described *Taufikia ghoshi* (1966), *Mogheia bayamegaparurterina* (1967), *Hymenocoelia chauhani* n.g., n. sp.(1964 with Srivastava, V.C.), *Columbia muiri* (1966, with Srivastava, V.C.), *Moghia megaparuterina* (1966, with Srivastava,V.C.), *Davainea hewetensis* (1972, with Dhawan), *Valipora sultanpurensis* (1975, with Srivastava, V.C. and Chauhan), *Joyeuxiella vulpusi* (1976

with Srivastava, V.C.) and *Barbusa passeri* n.g., n.sp. (1976, with Srivastava, V.C.). Capoor and Srivastava, V.C. erected two new genera viz. *Barbusa* and *Hymenocoelia*.

Shinde described a number of cestodes from Maharashtra. His important contributions are *Sureshia affinis* (1968), *Sureshia alii* (1968), *Lapwingia malabarica* (1972), *Lapwingia singhi* (1972), *Lapwingia yogeshwarii* (1972), *Neyraia moghei* (1972), and *Neoliga singhi* (1981). He erected a new genus *Madiangularia.*

Gupta, N.K. and Grewal, S.S. described *Raillietina (R.) buckleyi* (1969), *Raillietina (R.) streptopeliae* (1969), *Raillietina (R.) inda* (1970), *Cotugnia meggitti* (1971), *Ophryocotyloides corvorum* (1971), *Ophryocotyloides sharmai* (1971). Gupta and Madhu described *Raillietina (R.) rybickae* (1981) and *Raillietina (R.) delhiensis* (1982).

Malviya and Dutt described a new species of *Cotugnia* (1969), *Raillietina (R.), mehrai* (1971), *Raillietina (R.) singhi* (1971) and *Raillietina (R.) torquata* (1971).

Nama's publications include *Cittotaenia krishnai* (1974), *Myotolepis* sp. (1974), *Thysaniezia aspinosa* (1974), *Thysanosoma misrai* (1974), *Mathevotaenia*

sanchovensis (1973, with Khichi) and *Staphylocystis sanchorensis* (1975 with Khichi).

Pandey, K.C. studied and described some species of cestodes from birds. He described two new species *Staphylepis indica* and *Staphylepis meggitti* (1981, with Tayal, V.), *Neyraia meerutensis* (1982, with Chaudhary), *Lapwingia sureshi* (1984), *Panuwa chauhani* (1984), *Panuwa roriensis* (1984) and *Sobolevicanthus meerutensis* (1983 with Rajvanshi).

Srivastav, A.K. described a number of cestode species from birds and mammals. They are *Vampirolepis molus* (1979 with Capoor), *Neyraia sultanpurensis* (1980), *Dicranotaenia alcippina* (1980, with Capoor), *Valipora amethiensis* (1981, with Capoor), *Ophryocotylus dinopii* (1982, with Capoor), *Cotugnia rihandensis* (1984, with Capoor). *Cotugnia parakeetus* (1985, with Capoor). He erected a new genus *Ophryocotylus* from the avian host.

The pioneer workers on the morphology and taxonomy of cestodes of birds from the Bundelkhand region are Srivastav, B.K. and Srivastav, A.K. They described *Amoebotaenia capoori* (1987), *Neyraia dayali* (1988),

Raillietina (F.) talourensis (1988), *Raillietina (P.) amethiensis* and *Raillietina (P.) mothensis* (1988, with Dhirendra) and *Doublesetina fotedari* (1989). They erected a new genus *Doublestina* (1989) from avian host.

Gupta, S.P. and Sinha, N. described *Mogheia copsychi* (1982), *Mogheia orioli* (1982), *Angularella corvunensis* (1985), *Lateriporus dicruri* (1985) and *Neoangularia micropusi* (1985).

Apart from the aforesaid contributions a number of stray papers have been published by Führmann, (1905, 1908, 1909 and 1912), Linstow (1906), Smith, Fox and White (1908), Johnston (1909, 1911), Baczynska (1914), Sondhi (1923), Joyeux (1928 with Houdemer), Subramanian (1928), Patawardhan (1935), Bhalerao (1936), Amin (1939, 1940), Mudaliar (1943), C hatterjee (1954), Sawada, I (1964) described the genus *Raillietina*. Mukerjee (1964,1965, 1970), Ali and Shinde (1966), Fotedar (1973,1976,1977,1980 with Chishti), Fotedar (1978 with Bambroo), Khan and Habibullah (1967,1971) from Pakistan, Dhawan and Capoor (1972), Chishti (1973,1980), Fotedar (1974), Bilqees (1974, with Sultana), Ghosh (1975), Baugh and Saxena (1975,1976). Kalyankar and Palladwar (1977),

Matta and Ahluwalia (1977), Wason and Johnson (1977), Saxena (1978 with Baugh), Ghare and Shinde (1980), Grewal and Kaur (1981), Jadhav and Shinde (1981), Kishore and Sinha (1982), Chisti (1982, with Khan), Srivastava, C.B. (1983, with Pandey, K.C. and Tayal, V.), Kolluri, Vijaya Lakshmi and Rao (1984,1985), Dixit and Capoor (1981, 1986), Chisti (1986, Mir and Rasool), Bhalya and Capoor (1987 a and 1987 b) and Sharma and Mathur (1987).

Studies on host parasite relationship are very scanty. The important contributions are as under:

Holl (1932) described the ecology of certain fishes and amphibians with special reference to helminth linguatulid parasites. Patwardhan (1935) described the nematodes from the common wall lizard, *Hemidactylus flaviviridis* (Ruppel). Clapham (1936) made observations on the occurrence and incidence of helminth in British Partridges. Davis (1938) studied some factors governing the incidence of helminth parasites in the domestic duck. Read (1950) described the vertebrate small intestine as an environment for parasitic helminths. Mazuromovich (1951) worked on parasitic worm of Amphibia. Markov and Rogoza (1955) described annual differences in the parasite of grass frogs,

Rana temporaia. Hugghins (1956) worked on ecological studies in trematodes of Bull heads and cormorants at spring lake. Hutchinson (1957) described the incidence and distribution of *Hydatigera taeniaeformis* and other intestinal helminths in Scottish. Otto (1958) worked on some reflections on the ecology of the parasitism. Hopkins (1959) described seasonal variations in the incidence and development of the cestode, *Proteocephalus filicollis* in *Gastrosteus aculeatus.* Dogiel (1961) worked on ecology of the parasites of fresh water fishes. Lees (1962) described the incidence of helminth parasites in a particular frog population. Thomas (1964) explained a comparison between the helminth burdens of male and female brown trout, *Salmo trutta* L. from a natural population in the river Tiefy West Wales. Aldrich (1965) made observations on the ecology and life cycle of *Prochristianella penaei* kruse. Kinsella (1966) described the helminth fauna of Florida, Scrub Jay: Host and ecological relationships. Kozar, Ramisz and Kozar (1966) described the incidence of *Trichinella spiralis* in some domestic and wild living animals in Poland. Esch and Gibbons (1967) described seasonal incidence of parasitism in the painted turtle, *chrysemyas pictamarginata.* Rao and Anantharaman (1967) worked on the incidence of trematodes of

the family Heterophyidae of frogs, dogs and cats in India. Chengyen and Wei - chu (1968) worked on the seasonal incidence of the blood flukes of pond fishes in Taihu. Knodo, Kurimoto, Okano and Oda (1968) worked on infective incidence of dogs, cats and rats with *Clonorchis sinensis* around the lake Biwa. Avery (1969) described the ecology of tapeworm parasites in wild fowl. Kennedy (1969) worked on seasonal incidence and development of cestode, *Caryophylleus laticeps* in the river Avon. Knight, Barbay and Morrison (1969) worked on incidence of infection by lung fluke *(Haematoloechus)* of the Bull frog, *Rana catesbeiana* in Jefferon. William and Halvorsen (1969) worked on the incidence and degree of infection of cod, *Gadus callarias* with *Abothrium gadi.* Fabiyi (1972) described incidence of helminth parasites of the domestic fowl in Vom area of Benue - plateau state, Nigeria. Wikstrom (1972) described incidence of the broad fish tapeworm, *Diphyllobothrium latum* in human population of Finland. Alave and Ansari (1973) described incidence and seasonal variations of *Heterakis gallinarium* infection in fowl. Eure (1976) described seasonal abundance of *Neoechinorhynchus cylindratus* taken from large mouth bass *(Micropterus salmoides)* in a heated reservoir. Nama and Parihar (1976) worked on quantitative and qualitative

analysis of helminth fauna in *Rattus rattus rufescens*. Singhvi and Jhonson (1976) worked on the systematics, distribution, population dynamics and seasonal variation of the helminth parasites of the common house rat, *Rattus rattus*. Saxena and Nama (1976) described the incidence of helminth parasites in the domestic fowl in Jodhpur, Rajsthan. Chubb (1977) described seasonal occurrence of Monogenea in fresh water fishes. Kazic and Ubelakar et al. (1977) made observation and seasonal variations of the helminth fauna of *Gobio gobio, Lapido laemus* from lake skadar, Yugoslavia. Singhvi and Jhonson (1977) described the female to male ratio (FMR) in dominant nematode population in the house rat, *Rattus rattus*. Carneiro, Campos, D.M.B., Lustosa and Pereira (1979) described prevalence of helminth parasite of *Gallus gallus domesticus* in Goiania County, Brazil. Singhvi and Jhonson (1979) described concurrent nematode infection in the house rat, *Rattus rattus.* Capoor and Malhotra (1980) described infestation of cestode infection in avian host of Garhwal hills. Dixit and Capoor (1980) described incidence of cestode infection in reptiles in relation with temperature in district Allahabad. Krishnaswami, Singh, Ambu and Ramachandran (1980) described seasonal prevalence of the helminth fauna of wood rat, *Rattus*

tiomanicus (Miller) in West Malaysia. Malhotra, Chauhan and Capoor (1980) worked on nematode infection in relation to some ecological aspects of hill stream fishes. Muraleedharan and Venkataraman (1980) described incidence of helminthic infections in fowls in Andhra Pradesh. Singhvi and Jhonson (1980) worked on Gastrointestinal parasitism of the house rat, *Rattus rattus* in relation to sex and age. Chauhan and Malhotra et al. (1981) worked on the analysis of parasitization index and certain ecological parameters of cestode parasites infesting in hill stream fishes of district PauriGarhwal. Malhotra with Chauhan and Capoor (1981) described statistical analysis of nematode infection in relation to some ecological aspects of fishes in Garhwal Himalayas, India. Bhawnek and Sinha (1982) described seasonal distribution of cestodes in domestic fowl of West Bengal. Malhotra, Capoor, Bhalya and Seth (1982) described influence of sex and weight of poultry on *Heterakis gallinarium* infection in subhimid region. Margolis, et al. (1982) described the use of ecological terms in parasitology. Senyonga (1982) described prevalence of helminth parasites of domestic fowl (*Gallus domesticus*) in Uganda. Esch (1983) worked on the population and community ecology of cestodes.

Malhotra and Capoor (1984) described population structure of nematode parasites in poultry of a subhumid region. Malhotra and Chauhan (1984) described distribution of cestodes in the digestive tract of Indian hill stream fishes. Amin (1986) worked on Acanthocephala from lake fishes Wisconsin, Host and seasonal distribution of species of genus *Neoechinorhynchus.* Srivastava, B.K. (1989) worked on study of avian cestode parasites and ecological observation of fowl of Jhansi. Jha and Sinha (1990) described the occurrence of helminth parasites in relation to the size of fish. Malhotra (1992) described inter relationship of *Heterakis pavonis* infection in poultry of an Indian subhumid region with season, temperature and sex of host. Mathur (1992) worked on Piscian cestodes and their ecological study in *Heteropneustes fossilis.* Saberwal with Malhotra and Capoor (1992) described ecological dynamics of Proteocephalid infections in *Wallago attu* at Allahabad. Lohia (2000) worked on the Piscian tapeworms with special reference to certain parameter of ecohaematology of *Channa punctatus.*

MATERIALS AND METHODS

For morphotaxonomical study the alimentary canal of the amniote hosts were cut open in normal saline water in troughs or petridishes. It was lightly shaken and its contents decanted several times. The intestine and its contents containing helminth parasites were examined thoroughly under a binocular microscope to ensure that none of the parasite is left behind. In some cases, the scolices of cestodes were deeply embedded, it was found necessary to take them out by scrapping the mucosa of the intestine with sharp scalpel or by releasing the scolices with a pair of needles or forceps. Later the portion of the mucosa attached to the cestode body was removed by shaking the body of cestode in normal saline water and in case of larger worms, by lifting them with the help of needles or forceps against the edges of petridishes repeatedly for several times and later on fixed in 5 % formalin or in alcoholic Bouin's fluid. Worms fixed in Boun's fluid were washed in water, treated with 50 % and 70 % alcohols and finally stored in 70 % alcohol.

The whole mounts were stained in Mayer's Haemalum and cleared in xylol or clove oil. For sectioning, the material was cleared in xylol embedded in histowax and cut at

0.006 – 0.008 mm., stained with Delafield's Haematoxyline and Eosin and mounted in Canada Balsam or DPX.

Only camera lucida drawings were made. All measurements have been given in millimeters unless stated otherwise. Average taken on the basis of the study of five to ten worms except in cases where still fewer worms were obtained.

For ecological study of host parasite relationships, the three amniote host species viz. – the common wall lizard, *Hemidactylus flaviviridis* (Ruppel), the domestic fowl, *Gallus gallus* (Linnaeus) and the common rat, *Rattus rattus* (Linnaeus) were examined regularly every months for two successive year from October, 1998 to September, 2000. The live amniote hosts were obtained through local animal catcher. The following data were recorded for the study of host parasite relationship.

(a) Sex of host

(b) Number of different helminth parasites obtained.

The following process was used in this study:

1. Live amniote hosts were anesthetized with the help of chloroform.

2. The animal was dissected quickly to find out the sex by locating testes for male or ovaries for female.
3. The alimentary canal, gall bladder and liver was cut open in the normal saline water in petridishes or troughs.
4. All the four kinds of helminth parasites viz.- cestodes, trematodes, nematodes and acathocephala were collected and counted separately in each infection.
5. The different helminth parasites were stored in 5 % formalin in separate tubes.

During the course of study a total number of 70 wall lizard, *Hemidactylus flaviviridis* (Ruppel) were examined and 64 of them were found infected. Six wall lizards were found negative for helminth infection. The total number of 462 helminth parasite were obtained which included 34 cestodes, 107 trematodes, 321 nematodes and no acanthocephala

A total number of 69 domestic fowls , *Gallus gallus* (Linnaeues) were examined and 65 of them were found infected . Four domestic fowls were found negative for helminth infection . The total number of 5822 helminth parasites were obtained which included 1630 cestodes, 1161 trematodes, 3031 nematodes and no acanthocephala.

A total number of 54 common rats , *Rattus rattus* (Linnaeues) were examined and 45 of them were found infected . Nine common rats were found negative for helminth infection The total number of 179 helminth parasites were obtained which included 95 cestodes, no trematode, 70 nematodes and 14 acanthocephala.

The prevalence, mean intensity and relative density of different helminth parasites of the three amniote hosts were calculated monthwise, seasonwise and on annual basis in relation to the sex of the host by the formulae described by Margolis et al., 1982.

The definitions and formulae for the calculation of prevalence, mean intensity and relative density given by Margolis et al.,1982 are as under:

PREVALENCE

Number of individuals of a host species infected with a particular parasite species divided by number of host examined.

$$\text{Prevalence} = \frac{\text{Number of hosts infected}}{\text{Number of hosts examined}}$$

MEAN INTENSITY

Total number of individuals of particular parasite species in a sample of a host species divided by number of infected individuals of host species in the sample.

$$\text{Mean intensity} = \frac{\text{Total number of parasites obtained}}{\text{Total number of hosts infected}}$$

RELATIVE DENSITY

Total number of individuals of a particular parasite species in a sample of host divided by total number of individuals of the host species.

$$\text{Relative density} = \frac{\text{Total number of parasites obtained}}{\text{Total number of hosts examined}}$$

The figures in relation to prevalence, mean intensity and relative density of the different amniote host parasites have been given as under:

1. Monthwise prevalence, mean intensity and relative density variations of different helminth parasites are shown by simple lined coloured diagrams to differentiate male and female individuals.

2. Seasonal prevalence, mean intensity and relative density variations of different helminth parasites are shown by simple coloured column diagrams to differentiate male and female individuals.
3. Annual prevalence, mean intensity and relative density variations of different helminth parasites are shown by simple coloured pie diagrams to differentiate male and female individuals.

The data related to the prevalence, mean intensity and relative density of different helminth parasites of amniote hosts have been categorized as given in the table:

Table 1: Range of Values of different parasites related to Prevalence, Mean intensity and Relative density in amniote hosts.

Value	Prevalence	Mean intensity	Relative density
Low	0.00 - 0.30	1 - 27	1 - 27
Moderate	0.31 - 0.70	28 - 65	28 - 65
High	0.71 - 1.00	66 to onwards	66 to onwards

HOST PARASITE LIST

Table 2. HOST PARASITE LIST - MORPHOTAXONOMICAL

Sl. No.	Name of the Host	No. of Host examined	No. of Host infected	Name of Cestodes obtained
	Class - Reptilia			
1.	*Bungarus coeruleus*	3	1	*Oochoristica sp.*
2.	*Calotis versicolor*	6	3	*Oochoristica sp.*
3.	*Hemidactylus flaviviridis*	18	6	*Oochoristica sp.*
4.	*Naja tripudians*	2	1	*Ophiotaenia sp.*
5	*Varanus bengalensis*	2	1	*Rostellotaenia sp.*
	Class - Aves			
6.	*Acridotheres tristis*	5	1	*Dicranotaenia sp.* *Mayhewia sp.*
7.	*Apus melba*	6	1	*Neoangularia sp.*
8.	*Columba livia*	20	2	*Cotugnia sp.* *Hymenocoelia sp.* *Killigrewia sp.* *Raillietina (F.) jhansiensis n.sp.*
9.	*Corvus splendens*	10	3	*Raillietina (P,) culiauana (*Tubangui *et* Masilungan)

10.	*Francolinus pondicerianus*	12	2	*Cotugnia sp.* *Rhabdometra sp.* *Raillietina (S.) francoliana n.sp.* *Raillietina (S.) jagdishei n.sp.*
11.	*Gallus gallus*	50	6	*Amoebotaenia sp.* *Cotugnia sp.* *Davainea sp.* *Raillietina (R.) tetragona* (Molin) *Staphylepis sp.*
12.	*Hirundo rustica*	18	2	*Neoliga sp.*
13.	*Limosa limosa*	12	2	*Australiolepis sp.*
14.	*Nycticorax nycticorax*	6	1	*Valipora sp.*
15.	*Passer montanus*	4	1	*Unciunia sp.*
16.	*Passer domesticus*	2	1	*Barbusa sp.*
17.	*Phalacrocorax niger*	5	1	*Paradilepis sp.*
18.	*Psittacula krameri*	5	3	*Cotugnia sp.*
19.	*Streptopelia sengalensis*	6	3	*Dovinella streptensis n.g., n.sp.* *Raillietina (F.) baruasagari n.sp.*

Contd...

				Raillietina (R.)
				lalitpurensis n.sp.
20.	*Turdoides sommervili*	3	1	*Anonchotaenia sp.*
				Passerilepis sp.
	Class - Mammalia			
21.	*Canis familiaris*	8	4	*Echinococcus sp.*
				Taenia sp.
22.	*Capra hircus*	21	3	*Avitellina sp.*
				Jordangria sp.
				Moniezia sp.
				Stilesia sp.
23.	*Crocidura murianus*	20	4	*Vampirolepis sp.*
24.	*Felis domesticus*	1	1	*Taenia sp.*
25.	*Rattus rattus*	35	5	*Hymenolepis sp.*
				Mathevotaenia sp.
26.	*Vulpus bengalensis*	1	1	*Joyeuxilla sp.*

TABLE 3. HOST PARASITE LIST - ECOLOGICAL

Name of the host	Number of Host examined	Number of Host infected	Number of parasites obtained
Class- Reptilia ***Hemidactylus flaviviridis*** **(Ruppel)**	70	16	Cestodes-34
		27	Trematodes-107
		64	Nematodes-321
		00	Acanthocephala-00
		64	Helminths-462
Class- Aves ***Gallus gallus*** **(Linnaeus)**	69	57	Cestodes-1630
		06	Trematodes-1161
		64	Nematodes-3031
		00	Acanthocephala-00
		65	Helminths-5822
Class- Mammalia ***Rattus rattus*** **(Linnaeus)**	54	37	Cestodes-95
		00	Trematodes-00
		23	Nematodes-70
		03	Acanthocephala-14
		45	Helminths-179

Classified List of the Cestode Parasites described in the Thesis

Class: Cestoda

Subclass: Eucestoda, Southwell, 1930.

Order: Cyclophyllidea, Ben. in Braün, 1900.

Family: Davaineidae, Führmann, 1907.

Subfamily: Davaineinae, Braün, 1900.

Genus: *Dovinella*, Srivastava and Srivastava, 1996.

Species: *Dovinella streptensis*, Srivastava and Srivastava, 1996.

Genus: *Raillietina*, Führmann, 1920.

Subgenus: *Paroniella*, Führmann, 1920.

Species: *Raillietina (Paroniella) culiauana*, Tubangui *et* Masilungan, 1937.

Subgenus: *Skrjabinia*, Führmann, 1920.

Species: *Raillietina (Skrjabinia) fracoliana* n. sp.

Species: *Raillietina (Skrjabinia) jagdishei* n. sp.

Subgenus: *Raillietina*, Führmann, 1920.

Species: *Raillietina (Raillietina) lalitpurensis* n. sp.

Species: *Raillietina (Raillietina) tetragona* (Molin, 1858).

Subgenus: *Führmannetta*, Stiles and Orlemann, *1926*.

Species: *Raillietina (Führmannetta) baruasagari* n. sp.

Species: *Raillietina (Führmannetta) jhansiensis* n. sp.

MORPHOTAXONOMY
OF
CESTODE PARASITES

ON A NEW DAVAINID CESTODE, *DOVINELLA STREPTENSIS* N.G., N. SP. FROM THE DOVE, *STREPTOPELIA SENGALENSIS* (LINN.).

INTRODUCTION

One dove, *Streptopelia sengalensis* was found infected with eighteen alike cestodes. They belong to the proposed genus *Dovinella streptensis* n. g., n. sp. of the Subfamily: Davai neinae, Braün,1900 of family Davaineidae, Führmann, 1907.

MATERIALS AND METHODS

The bird hosts were purchased through a local bird dealer at Allahabad. Usual techniques for collection and preservation of the whole mounts were employed. After proper stretching, the cestodes were fixed in 5% formaldehyde and alcoholic Bouin's fluid. Whole mounts were stained in Haemalum. Figures were drawn with camera lucida.

DESCRIPTION

(Amended characters of the subfamily Davaineinae). Worms small to medium. Suckers armed with several circles of minute spines. Rostellum well developed armed with 3 alternating rows of hammer shaped hooks. Proglottids numerous, transversely

elongated, slightly craspedote. Testes usually few in number, posterolateral to female genitalia and do not extend laterally beyond the limits of the ventral longitudinal excretory canals. Cirrus pouch usually not reaching the poral excretory canals. Genital pores unilateral. Ovary bilobed and not median. Vitelline gland compact, post ovarian. Egg capsules containing several eggs. Adults in birds. Type species *Dovinella streptensis* n. g., n. sp.

Dovinella streptensis n.g., n.sp. (Figs. 1–6). (All measurements in mm unless otherwise mentioned). Cestodes 25 – 40 in length and 1.15 in width. Strobila consists of many broader than long, craspedote proglottids.

Scolex, 0.095 - 0.15 x 0.016 - 0.20 (0.12 x 0.10) not well demarcated from the neck. Suckers, 0.055 - 0.60 x 0.06 - 0.08 (0.056 x 0.07) armed with 7 –8 rows of sucker spines measuring 0.0096 - 0.0112 (0.010). Rostellum 0.07 - 0.09 x 0.112 - 0.125 (0.084 x 0.118), retractile. Rostellar hooks 100 –110, arranged in 3 alternating rows. Rostellar hooks of the first row, 0.020 - 0.024 (0.03), those of the second row, 0.016 - 0.019 (0.018) and third row, 0.015 - 0.017 (0.016), in length. Neck prominent, 0.056-0.112 x 0.196 - 0.224 (0.089 x 0.21). Immature proglottids, 0.028 - 0.154 x

0.154 - 0.42 (0.092 x 0.298). Mature proglottids, 0.084 - 0.21 x 0.518 - 1.12 (0.157 x 0.828), and the gravid proglottids, 0.49 - 0.714 x 0.70 - 0.98 (0.608 x 0.84). Testes, 0.03 - 0.045 x 0.033-0.051 (0.038 x 0.042). Laterally the testes do not extend beyond the ventral longitudinal excretory canals. Cirrus pouch, 0.07 - 0.098 x 0.028 - 0.035 (0.085 x 0.031) oval, not reaching upto the poral ventral longitudinal excretory canal. Vas deferens highly coiled. External and internal vesicula seminalis absent. Ovary transversely extended, 0.12 - 0.195 (0.163) wide. Vitelline gland oval, 0.015 - 0.024 x 0.018 - 0.033 (0.02 x 0.026), postovarian. Vagina 0.003-0.0036 in diameter. Receptaculum seminis absent. Vagina opens posterior to the cirrus pouch in the genital atrium. Genital atrium, 0.025 - 0.03 (0.028) wide and 0.014 - 0.028 (0.021) deep. Genital openings unilateral, situated in the anterior half of the proglottid margin.

Uterus replaced by egg capsules. Egg capsules, 0.084 - 0.144 x 0.07-0.098 (0.106 x 0.086). Each egg capsule contains 3 –6 eggs which were 0.028 - 0.042 (0.037) in diameter. Onchosphere was 0.005 - 0.014 (0.0095) in diameter. Ventral longitudinal excretory canal was 0.02 - 0.027 (0.023) in diameter.

DISCUSSION

Because of the presence of following character the present form come closer to the genus *Raillietina.*

(a) Single set of genitalia,

(b) Each egg capsule containing several eggs,

(c) Genital pores unilateral,

(d) Sucker margin with several circles of hooklets.

The major differences in the present form and *Raillietina (Raillietina)* lies in the fact that the present form possesses 3 alternating rows of rostellar hooks while in *Raillietina(Raillietina)* only two alternating rows of rostellar hooks are present.

Hence it is proposed to accommodate the present form as a new genus, *Dovinella* n.g. and a new species, *Dovinella streptensis* n. sp.

Host : *Streptopelia sengalensis* (Linn)

Habitat : Intestine

Locality : Allahabad.

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Family -	Davaineidae Führmann, 1907
Subfamily -	Davaineinae Braün, 1900
Genus -	*Raillietina* Führmann, 1920
Subgenus -	*Paroniella* Führmann, 1920
Species -	*Raillietina (Paroniella) culiauana* (Tubangui *et.* Masilungan, 1937).

Plate No. 1

Of the three crows, *Corvus splendens* (Vieillot) examined, only one was found infected with seven cestodes. The costodes were obtained from the intestine of the host. Their morphological studies revealed them to belong to the subgenus *Paroniella* Führmann, 1920 of the genus *Raillietina* Führmann, 1920 belonging to the subfamily Davaineinae Braün, 1900, Family Davaineidae Führmann, 1907.

The cestodes are medium in size measuring 15 - 20 (18) cm in length and 2.40 in the maximum breadth that is seen in the gravid proglottids. The strobila consist of many proglottids, all of them are broader than long.

The scolex is not distinctly demarcated from the neck. The scolex measures 0.30 - 0.32 x 0.44 - 0.65 (0.31 x 0.56). It bears four oval suckers that measure 0.12 - 0.13 x 0.096 - 0.12 (0.124 x 0.10).

The suckers are provided with 3-10 rows of sucker spines measuring 0.001 - 0.003 in length. The rostellum is discoid measuring 0.08 - 0.10 x 0.15 - 0.17 (0.09 x 0.16). It is armed with about 300 hooks that are arranged in two alternate rows. The hooks of the anterior rows are larger than those of the posterior row. The hooks of the anterior row measure 0.016 - 0.018 (0.016) while the hooks of the posterior row measure 0.015 in length.

The scolex is followed by a prominent neck which is 1.0 - 1.4 (1.2) in length. The proglottids are craspedote. The immature proglottids measure 0.06 - 0.20 x 0.28 – 0.36 (0.13 x 0.32). The mature proglottids are 0.22 – 0.60 x 0.50 – 2.20 (0.41 x 1.3). The gravid proglottids measure 0.52 - 1.05 x 1.10 - 2.40 (0.70 x 1.75).

The testes are round to oval and are distributed in two groups, one on either side of the female genitalia. Laterally, the testes do not extend beyond the ventral longitudinal excretory canals. The testes number 30 - 50 (40) in each proglottid. The poral group consists of 8 - 11 testes while the aporal group consists of 20 - 30 testes. The testes measure 0.03 - 0.07 (0.05) in diameter. The cirrus pouch is small and oval, measuring 0.075 - 0.168 x 0.052-0.072 (0.121 x 0.06). The cirrus pouch does not reach the poral ventral longitudinal

excretory canal. The vas deferens is coiled. The internal and external vesicula seminalis are absent.

The female genitalia are medially disposed. The ovary is initially bilobed. Each lobe of the ovary is subdivided into 5 - 15 short processes. The ovary measures 0.10 - 0.40 (0.25) across. The vitelline gland is compact and variously lobed. It measures 0.05 - 0.16 (0.10) across and is located posterior to the ovary. The vagina measures 0.0024 - 0.0072 (0.004) in diameter and opens in the genital atrium, posterior to the opening of the cirrus pouch. The receptaculum seminis is absent. The genital ducts are medial. The genital atrium measures 0.18 - 0.40 (0.29) in width and 0.08 - 0.20 (0.14) in depth. The genital openings are unilateral, situated in the anterior half of the proglottid margin.

The uterus is initially a multi branched sac which breaks up into egg-capsules. The egg-capsules fill up the entire gravid proglottid extending even beyond the ventral longitudinal excretory canals. The egg-capsules measures 0.024 - 0.036 (0.03) and are provided with single egg in each. The eggs measure 0.006 - 0.012 (0.009).

The ventral longitudinal excretory canals measure 0.035 – 0.10 (0.06) in diameter. The dorsal longitudinal excretory canals measure

0.02 – 0.04 (0.03) in diameter. The ventral longitudinal excretory canals are connected by means of transverse excretory canals measuring 0.009 - 0.012 (0.01) in diameter and situated near the posterior margin of the proglottid.

DISCUSSION

A comparison of the present form with the reported species of *Raillietina (Paroniella)* reveals its closeness to *Raillietina (Paroniella) culiauana* (Tubangui *et.* Masilungan, 1937).

However, the present form shows smaller suckers, slight difference in the size of anterior and posterior rostellar hooks, wider cirrus pouch and smaller eggs but these minor differences do not appear to be significant. Hence the present form is considered as a representative of *Raillietina (Paroniella) culiauana* (Tubangui *et.* Masilungan, 1937). It happens to be the first report of occurrence of the species from India.

Host - *Corvus splendens* (Vieillot)

Habitat - Intestine

Locality - Jhansi U.P.

Table 4. Comparison of the present form with *Raillietina(Paroniella) culiauana*, Tubangui et. Masilungan, 1937

Characters	*Raillietina(Paroniella) culiauana*, (Tubangui et. Masilungan, 1937)	Present form
Strobila	150 x 3.3	15 – 20 cm x 2.40
Scolex	0.45	0.30 – 0.32 x 0.44 – 0.65
Sucker diam.	0.15 – 0.17	0.12 – 0.13 x 0.096 – 0.12
Sucker spines	0.0096 – 0.0134	3 – 10 rows
Rostellum	0.1 x 0.17	0.08 – 0.10 x 0.15 – 0.17
Rosteller hooks		
Number	300	300
Size	0.0153 – 0.018	Ant. 0.016 – 0.018 Post. 0.015
Testes		
Number	30 - 33	30 – 50
Cirrus pouch	0.13 x 0.016	0.075 – 0.168 x 0.052 – 0.072
Ovary	0.2 x 0.4	0.10 – 0.40
Egg capsule	0.0385 – 0.046 x 0.034 – 0.038	0.024 – 0.036
Egg	0.021 – 0.023 x 0.0192	0.006 – 0.012

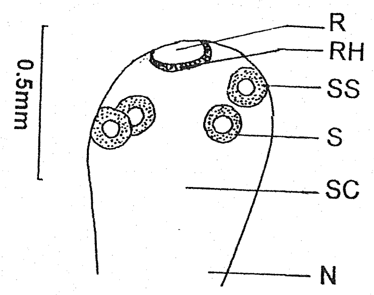

Fig. (a)

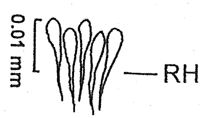

Fig. (b)

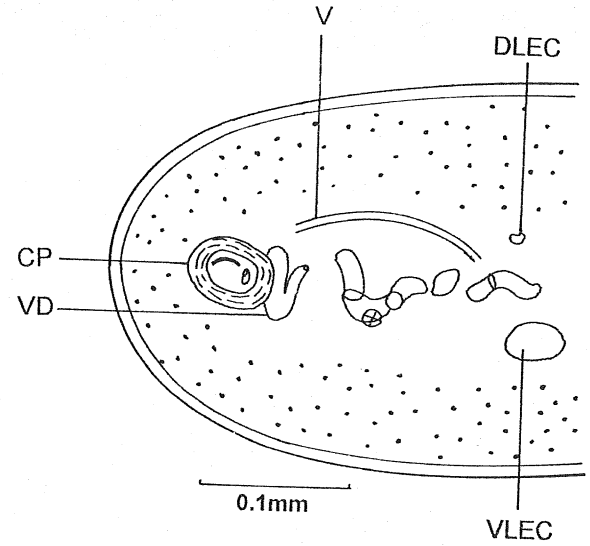

Fig. (d)

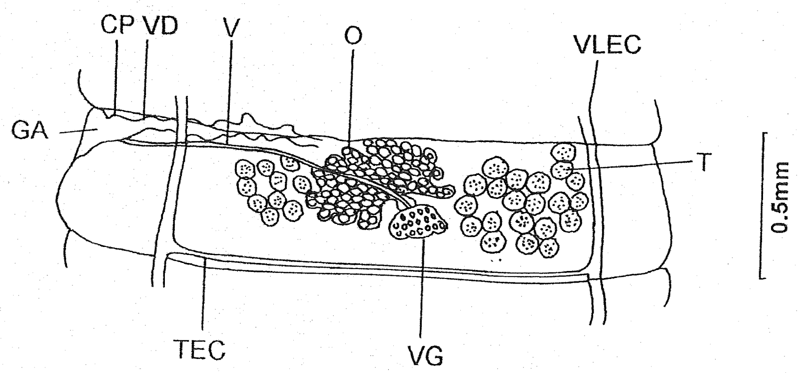

Fig. (c)

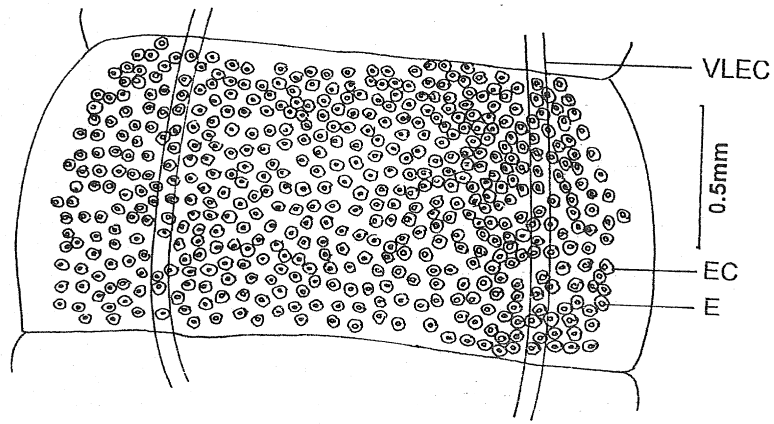

Fig. (e)

PLATE: 1

Family	-	Davaineidae Führmann, 1907
Subfamily	-	Davaineinae Braün, 1900
Genus	-	*Raillietina* Führmann, 1920
Subgenus	-	*Skrjabinia* Führmann, 1920
Species	-	*Raillietina (Skrjabinia) francoliana* n.sp.

Plate No. 2

Out of five grey partridges, *Francolinus pondicerianus* (Gmelin) examined at Jhansi (U.P.), one was found infected with nine specimens of cestodes in its intestine. The morphological studies of the cestodes revealed them to belong to the subgenus *Skrjabinia* Führmann, 1920 of the genus *Raillietina* Führmann, 1920, subfamily Davaineinae Braün, 1900, family Davaineidae Führmann, 1907.

Cestodes medium in size measuring 28 - 42 (35) in length 0.82 in maximum breadth as seen in the gravid proglottids. Strobila with numerous proglottids. Immature and mature proglottids broader than long to squarish. Gravid proglottids longer than broad.

Scolex distinctly marked off from the neck. Scolex measures 0.14 - 0.17 x 0.168 - 0.212 (0.15 x 0.19). Suckers four, oval to round measuring 0.028 - 0.075 (0.05) in diameter. Suckers armed with 6-9 rows of sucker spines. Rostellum broader than long measuring 0.05 - 0.06 x 0.068 - 0.112 (0.055 x 0.09). Rosteller hooks number 148 - 210 (175), arranged in two alternating rows. Rosteller hooks of both the rows measure 0.008 - 0.012 (0.01) in length.

Neck prominent measuring 0.27 - 0.33 x 0.086 - 0.140 (0.3 x 0.11). Proglottids are craspedote. Immature proglottids measure 0.0162 - 0.162 x 0.110 - 0.174 (0.089 x 0.142). Mature proglottids measure 0.184 - 0.272 x 0.224 - 0.280 (0.228 x 0.252) and gravid proglottids 1.02 - 1.18 x 0.60 - 0.82 (1.1 x.0.71).

Testes number 8-12 (10), oval to round, present all around the female genitalia except at the poral side. Laterally the testes do not extend beyond the ventral longitudianal excretory canal. Testes measure 0.030 - 0.046 (0.038) in diameter. Cirrus pouch elongated measuring 0.130 - 0.142 x 0.030-0.040 (0.136 x.0.35), well past the poral longitudinal excretory canal reaching upto the middle of the proglottid. Vas deferens coiled. External and internal seminal vesicles absent. Cirrus not seen.

Female genitalia located in the posterior half of the proglottid. Ovary bilobed, each lobe with small lobulations. Ovary measures 0.030 - 0.050 x 0.062 - 0.06 (0.04 x 0.061). Vitelline gland compact, post ovarian measuring 0.22 - 0.030 x 0.030 - 0.042 (0.125 x.036). Vagina divisible into proximal conducting and distal copulatory region. Conducting region measures 0.0010 - 0.0014 (0.0012) in diameter. Copulatory region measures 0.062 - 0.072 x 0.030 - 0.042 (0.067 x 0.036). Vagina opens posterior to the male genital opening in the genital atrium. Receptaculum seminis absent.

Uterus breaks down into egg capsules which occupy the space within the limits of longitudinal excretory canal. Egg capsules measure 0.042 - 0.050 x 0.042 - 0.062 (0.046 x 0.052). Each egg capsules contains single egg. Eggs measure 0.028 – 0.04 (0.034).

Genital atrium 0.022 -. 0.032 (0.027) wide and 0.0162 - 0.032 (0.024) deep.Genital opening irregularly alternating, situated in the anterior half of the proglottid margin. Ventral longitudinal excretory canals measure 0.012 - 0.02 (0.016) in diameter. Dorsal longitudinal excretory canals and transverse excretory canals not seen.

DISCUSSION

A comparison of the present form with the reported species of *Raillietina (Skrjabinia)* Führmann, 1920 reveals its closeness to *R. (S.) cesticellus* (Molin, 1858), *R.(S.) circumvallata* (Krabbe,1869), *R.(S.) ransomi*(Williams,1931), *R.(S.) spinosissima*(Linstow,1890) and *R.(S.) variabilia* (Leigh,1941).

However the present form differs from *R.(S.)cesticellus* (Molin,1858) in smaller scolex, smaller sucker with sucker spines, smaller rostellum, fewer rostellar hooks and fewer testes. It differs from *R.(S.) circumvallata*(Krabbe, 1869) in smaller scolex, smaller suckers, smaller rostellum, fewer rostellar hooks, smaller cirrus pouch and fewer testes. From *R.(S.) ransomi* (Williams,1931), it differs in the presence of sucker spines, smaller rostellum, fewer rostellar hooks and fewer testes. From *R.(S.) spinosissima* (Linstow,1890) the present form differs in smaller scolex, fewer rostellar hooks, smaller cirrus pouch and fewer testes. It differs from *R.(S.) variabilia* (Leigh,1941) in longer rostellar hooks and smaller cirrus pouch.

In the light of above discussion it is proposed to accommodate the present form as a new species *Raillietina (Skrjabinia) francoliana* n.sp.

Host - *Francolinus pondicerianus*(Gmelin)

Habitat - Intestine

Locality - Jhansi U.P.

Table 5. **Comparison of the characters of the species closer to *Raillietina (Skrjabinia)francoliana*, n. sp.**

Characters	*R.(S.) cesticellus* (Molin, 1858)	*R.(S.) circumvallata* (Krabbe, 1869)	*R.(S.) ransomi* (Williams, 1931)	*R.(S.)spinosissima* (Linstow, 1890)	*R.(S.)variabilia* (Leigh, 1941)	Present form
Strobila						
Length	90 - 160	60 - 150	4 - 14	20	47 - 272	28 - 42
Width	1.5 – 2.5	2.5 – 3.0	0.65 – 1.0	1.7	0.6 – 2.8	0.82
Scolex width	0.3 – 0.5	0.6 – 0.65	-	0.8	0.116 – 0.171	0.168 – 0.212
Sucker diam.	0.115 – 0.13	0.186 – 0.196	-	0.03	0.047 – 0.058	0.026 – 0.075
Sucker spines	Absent	-	Absent	-	-	6 – 9 rows
Rostellum diam.	0.35 – 0.42	0.2 – 0.5	0.237 – 0.29	-	0.055 – 0.073	0.06 – 0.112
Rosteller hooks						
Number	300	800	500 - 550	600 - 700	160	140 – 210
Size	0.01	0.012 – 0.016	0.008 – 0.009	0.007 – 0.01	0.0073 – 0.008	0.008 – 0.012
Testes						
Number	15 - 25	15 - 20	15 - 25	12 - 15	11 - 14	8 - 12
Cirrus pouch	0.13 – 0.16	0.16	0.14 – 0.16	0.17	0.36	0.13 – 0.142
Egg capsule	0.092 – 0.119	-	-	0.075	-	0.042 – 0.062
Egg	0.031 – 0.053	-	-	0.04	-	0.028 – 0.04

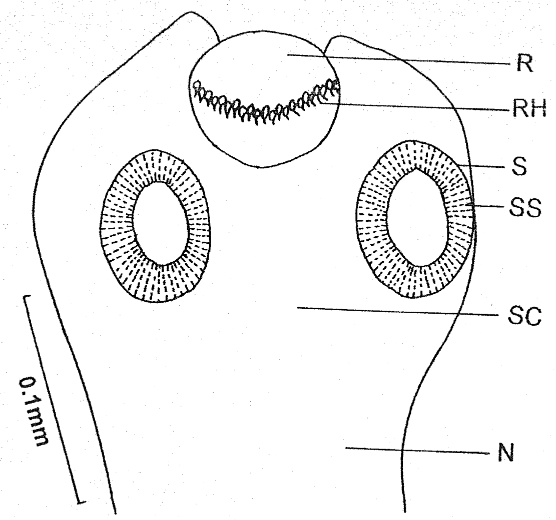

Fig. (a)

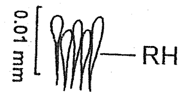

Fig. (b)

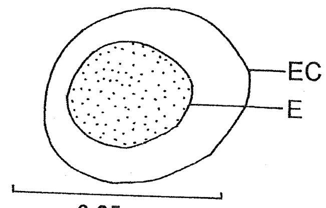

Fig. (e)

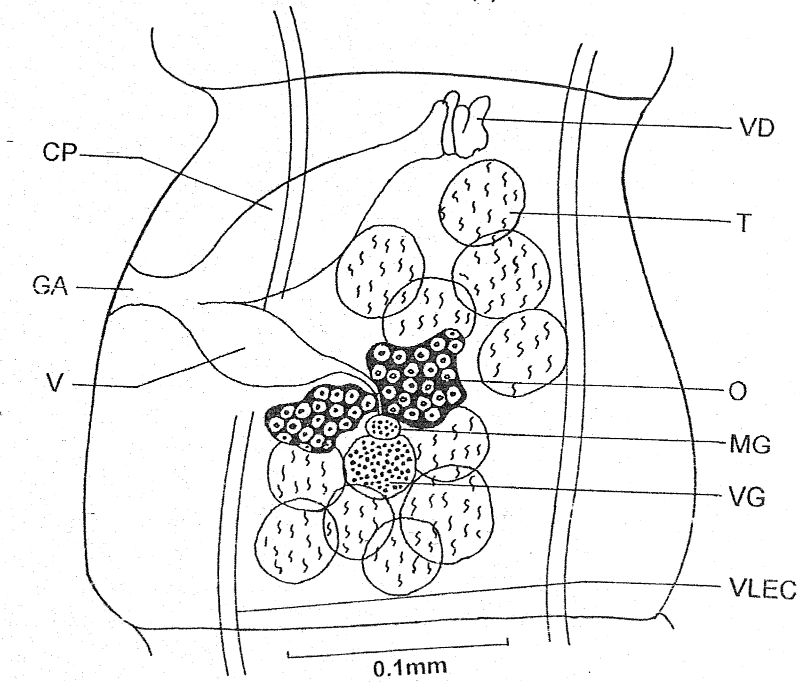

Fig. (c)

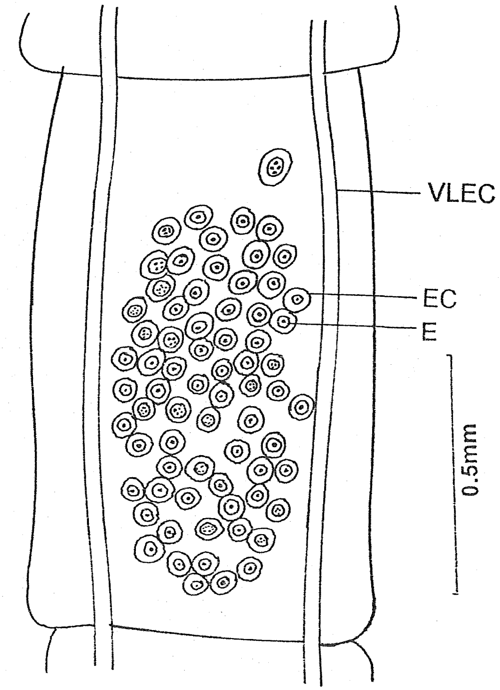

Fig. (d)

PLATE: 2

Family - Davaineidae Führmann, 1907

Subfamily - Davaineinae Braün, 1900

Genus - *Raillietina* Führmann, 1920

Subgenus - *Skrjabinia* Führmann, 1920

Species - *Raillietina* (*Skrjabinia) jagdishei* n.sp.

Plate No. 3

Out of the eight grey partridges, *Francolinus pondicerianus* (Gmelin) examined, only one was found infected with nine cestodes. The cestodes were obtained in the intestine of the host. The morphological studies of the cestodes revealed them to belong to the subgenus *Skrjabinia* Führmann, 1920 of the genus *Raillietina* Führmann, 1920 subfamily Davaineinae Braün,1900, family Davaineidae Führmann, 1907.

The cestodes are medium in size measuring 7 - 12 (9.5) cm in length and 0.884 in maximum breadth, which is attained by the gravid proglottids. The strobila consists of numerous proglottids. The immature proglottids are broader than long in the beginning, but become longer that broad later on. The mature proglottids are from broader than long to square or even longer than broad. The gravid proglottids are longer than broad.

The scolex is distinctly marked off from the neck, is quadrangular in shape measuring 0.32 - 0.34 x 0.27 - 0.29 (0.33 x 0.28). The scolex is provided with four spherical to oval suckers, which measure 0.064 - 0.084 x 0.058 - 0.076 (0.074 x 0.062). The suckers are armed with 4 - 5 rows of sucker spines which are 0.0024 - 0.0026 (0.0025) long. The rostellum is broader than long, measuring 0.04 - 0.082 x 0.08 - 0.112 (0.062-0.09). It is provided with about 350 pin shaped hooks that are arranged in two alternate rows. The hooks are 0.006 – 0.0075 (0.0065) in length.

The scolex is followed by a prominent neck that measures 1.40 - 1.45 (1.42) in length. The proglottids are craspedote. The immature proglottids measure 0.057 - 0.228 x 0.14 - 0.220 (0.142 x 0.182). The mature proglottids are 0.342 - 0.521 x 0.262 – 0.521 (0.431 x 0.391) and the gravid proglottids are 0.513 - 1.18 x 0.456 - 0.884(0.842 x. 0.670).

The testes are round to oval and encircle the female genital organs except at the region of genital ducts. Laterally they do not extend beyond the ventral longitudinal excretory canals. The testes number 9 - 13 (11) in each proglottid. They measure 0.032 - 0.076 (0.054) in diameter. The cirrus pouch is oval measuring 0.158 -

0.288 x 0.020 - 0.068 (0.22 x 0.044). It extends obliquely anteriorwards and is well past the poral longitudinal excretory canals. The vas deferens forms a loop before entering into the cirrus pouch. The external vasicula seminalis is absent while the internal vesilcula seminalis is present measuring 0.03 - 0.05 x 0.01 - 0.03 (0.04 x 0.02). The cirrus could not be seen.

The female genital organs are located in the posterior half of the proglottid. The ovary is single, bilobed, measuring 0.07 - 0.10 (0.08) across. The vitelline gland is compact and variously lobed, measuring 0.028 - 0.068 x 0.02 - 0.05 (0.048 x 0.036). The vagina is sinuous and measures 0.0075 - 0.010 (0.0087) in diameter. In the distal region darkly stained glandular cells surround the vagina. The vagina enlarges to form an elongated receptaculum seminis, near the ootype. The receptaculum seminis is measuring 0.034 - 0.05 x 0.01 - 0.03 (0.042 - 0.02). The vagina opens in the genital atrium, posterior to the opening of the cirrus pouch.

The genital ducts are medial. The genital atrium is prominent measuring 0.033 - 0.062 (0.047) wide and 0.013 - 0.016 (0.014) deep. The opening of the genital atrium is irregularly alternating and

situated near the posterior level of the anterior half of the proglottid margin.

The uterus is initially a bilobed sac measuring 0.044 - 0.07 (0.057) across. It breaks down into egg-capsules, sc attered throughout the medulla but not extending, laterally, beyond the ventral longitudinal excretory canals. The egg-capsules measure 0.03 - 0.07 (0.05) in diameter. Each egg capsules bears a single egg. The eggs measuring 0.01 - 0.026 (.018) in diameter.

The ventral longitudinal excretory canals measure 0.01 - 0.025 (0.0175) in diameter, while the dorsal longitudinal excretory canals measure 0.008 - 0.015 (0.011) in diameter. The longitudinal excretory canals run almost straight. The transverse excretory canals are absent.

DISCUSSION

A comparison of the present form with the reported species of *Raillietina* (*Skrjabinia)* Führmann, 1920 reveals its closeness to *R. (S.) caprimulgi* (Burt,1940), *R.(S.) cesticellus* (Molin,1858), *R.(S.) cryptocotyle* (Baer,1925), *R.(S.)kakia* (Johri,1934) and *R.(S.) variabilia* (Leigh,1941).

However, it differs from *R. (S.) caprimulgi* (Burt, 1940) in having longer storbila, larger scolex , larger suckers, fewer rows of sucker spines, more of smaller rostellar hooks, fewer testes, smaller ovary and larger egg capsules. From *R (S) cesticellus* (Molin, 1858) it differs in having smaller scolex, smaller suckers, presence of sucker spines, smaller rostellum, more of smaller rostellar hooks, larger cirrus pouch, fewer testes, smaller egg capsules and smaller eggs. The present form differs from *R. (S.) cryptocotyle* (Baer,1925) in having longer strobila, larger scolex, larger rostellum, more of smaller rostellar hooks and fewer testes. From *R. (S.) kakia* (Johri, 1934) it differs in having longer strobila, longer cirrus pouch and more testes. From *R. (S.) variabilia* (Leigh,1941) the present form differs in having longer strobila, larger scolex, larger suckers, larger rostellum, more of rostellar hooks and smaller cirrus pouch.

In the light of above discussion it is proposed to accommodate the present form as a new species *Raillietina (Skrjabinia) jagdishei* n. sp.

The species is named after late Dr. Jagdish Prasad Tewari, former Head of the Zoology Department, B.B. (P.G.) college, Jhansi.

Host – *Francolinus pondicerianus* (Gmelin)

Habitat – Intestine

Locality – Jhansi U. P.

Table 6. **Comparison of the characters of the species closer to *Raillietina* (*Skrajabinia*) *jagdishei*, n. sp.**

Characters	*R.(S.) caprimulgi* (Burt, 1940)	*R.(S.) cesticillus* (Molin, 1858)	*R.(S.) cryptocotyle* (Baer, 1925)	*R.(S.) kakia* (Johri, 1934)	*R.(S.) variabilia* (Leigh, 1941)	Present form
Strobila	25-35 x 0.756-0.88	90 – 160 x 1.5- 2.5	15 – 20 x 1.5	5 x 0.45	47 – 272 x 0.6 – 2.8	7 – 12 cm x 0.884
Scolex width	0.21- 0.26	0.3 – 0.5	0.19	-	0.116 – 0.171	0.27 – 0.29
Sucker diam.	0.051-0.061	0.115 – 0.130	-	-	0.047 – 0.058	0.064 – 0.084 x 0.058 – 0.076
Sucker spines	9-11 rows	Absent	-	-	-	4 – 6 rows
Rostellum diam	0.076-0.112	0.35 – 0.42	0.07	-	0.055 – 0.073	0.08 – 0.112
Rosteller hooks number	210- 240	300	140 – 150	-	160	350
Rosteller hooks size	0.011- 0.013	0.01	0.009 – 0.011	-	0.0073 – 0.008	0.006 – 0.0075
Cirrus pouch	0.172- 0.255	0.13 – 0.16	0.22	0.085 – 0.013	0.36	0.158 – 0.288 x 0.02 – .068
Testes number	17 - 21	15 - 25	18 – 20	6 – 10	11 – 14	19 - 13
Ovary diam	0.27	-	-	-	-	0.07 – 0.10
Egg capsule	0.027 – 0.03	0.092 – 0.119	0.03	-	-	0.03 – 0.07
Egg	0.017 – 0.021	0.031 –0.053	-	-	-	0.01 – 0.026

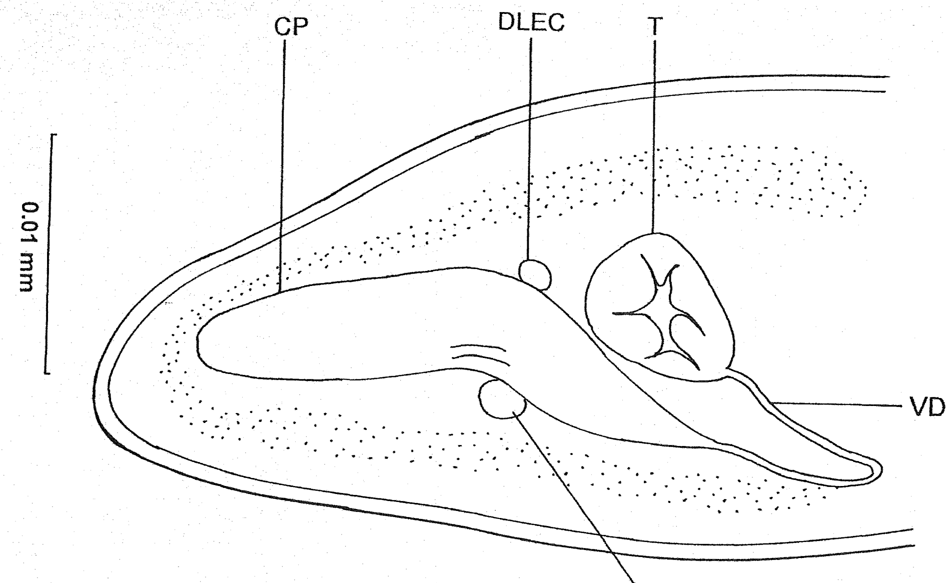

Fig. (d)

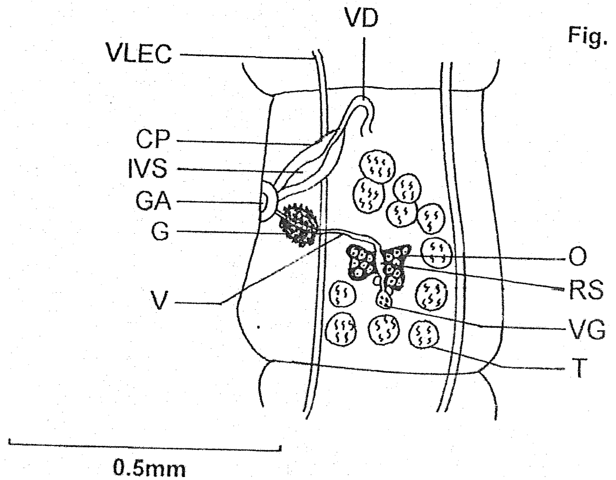

Fig. (c)

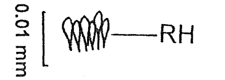

Fig. (b)

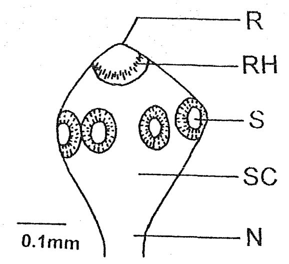

Fig. (a)

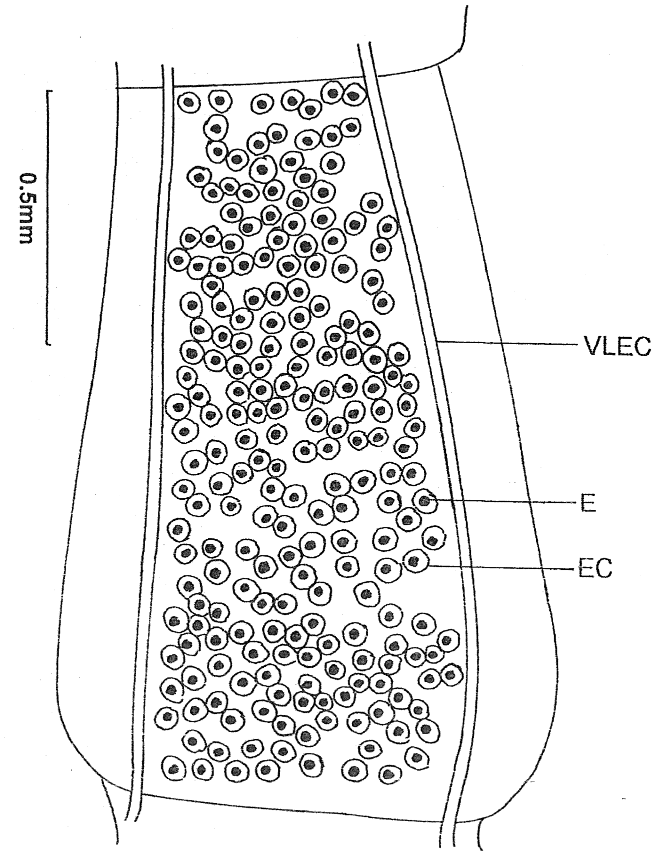

Fig. (e)

PLATE: 3

Family – Davaineidae Führmann, 1907

Subfamily – Davaineinae Braün, 1900

Genus – *Raillietina* Führmann, 1920

Subgenus – *Raillietina* Führmann,1900

Species – *Raillietina (Raillietina) lalitpurensis* n. sp.,

Plate No. 4

One, of the four little brown doves, *streptopelia sengalensis* (Linnaeus) examined at Lalitpur, was found infected with fifteen cestodes. The cestodes were obtained in the intestine of the host. Morphological studies revealed them to belong to the subgenus *Raillietina* Führmann, 1900, genus *Raillietina* Führmann, 1920, subfamily Davaineinae Braün, 1900, family Davaineidae Fuhrmann, 1907.

Cestodes measure 27-33 (30) in length and 0.87 in the maximum width as seen in the gravid proglottids. Strobila consists of a number of proglottids, all broader than long.

Scolex well demarcated from the neck. Scolex measures 0.25-0.27 x 0.204-0.21 (0.253 x 0.207). Suckers four, 0.048-0.07 x 0.045-0.08 (0.059 x 0.062), armed with 4-5 rows of sucker spines, measuring 0.009 in length. Rostellum discoid, broader than long,

measures 0.090 - 0.096 x 0.12-0.14 (0.093 x 0.134). Rosteller hooks number 108-120 (114), hammer shaped, arranged in two alternate rows. Rostellar hooks of the anterior row measure 0.018 – 0.024 (0.02) while those of the posterior row measure 0.015 - 0.02 (0.017) in length.

Neck prominent, 0.75-0.825 (0.79) in length and 0.09 - 0.15 (0.12) in width. Proglottids craspedote. Immature proglottids measure 0.03 - 0.12 x 0.135 - 0.225 (0.0718 x 0.173), mature proglottids measure 0.105 - 0.195 x 0.33 - 0.57 (0.145 x 0.45) and the gravid proglottids measure 0.21 - 0.375 x 0.42 - 0.87 (0.289 x 0.617).

Testes oval to round lying posterolateral to the female genitalia. Laterally, the testes, do not extend beyond the ventral longitudinal excretory canals. Testes number 9 - 10 in each proglottid and measure 0.012 - 0.45 x 0.012 - 0.04 (0.0286 x 0.026). Cirrus pouch oval, 0.057 -0.066 x 0.027 - 0.03(0.061 x 0.028), directed obliquely anteriorwards, not reaching up to the poral ventral longitudinal excretory canal. Vas deferens highly coiled before entering the cirrus pouch. Internal and external vesicula seminlis absent.

Female genital ia medial. Ovary bilobed, 0.087 - 0.108 (0.098) across. Vitelline gland compact, postovarian, 0.015 - 0.041 x 0.03 - 0.054 (0.025 x 0.043). Vagina measures 0.008 - 0.02 (0.013) in diameter, distally surrounded by glands. Receptaculum seminis absent.

Genital atrium shallow, 0.017 - 0.019 (0.018) in width and 0.006 - 0.009 (0.0075) in depth. Genital pores unilateral, located in the middle of proglottid margin.

Uterus breaks down in egg capsules which remain scattered throughout the proglottid, within the limits of the ventral excretory canals. Egg capsules number 25 - 35 (30) in each gravid proglottid and measure 0.03 - 0.075 x 0.04 - 0.06 (0.057 x 0.05) in diameter. Each egg capsule contains 4-7 (5) eggs which measure 0.015 - 0.035 x 0.01 - 0.03 (0.025 x 0.025).

Ventral longitudinal excretory canals measure 0.009 - 0.018 (0.014) in diameter. Dorsal longitudinal excretory canals and transverse excretory canals not seen.

DISCUSSION

The present form comes closer to *Raillietina (Raillietina) ceylonica* (Baczynska, 1914), *Raillietina (Raillietina) collinia* Webster, 1944, *Raillietina (Raillietina) congolensis* Baer *et* Fain ,

1955, *Raillietina (Raillietina) flaminata* Meggitt,1931, *Raillietina (Raillietina) torquata,* Meggitt,1924, *Raillietina (Raillietina) torquata rajae* Tubangui *et* Masilungan,1937. The present form differs from *Raillietina (Raillietina) ceylonica* (Baczynska, 1914) in having smaller scolex , smaller suckers, larger rostellum, smaller cirrus pouch and fewer eggs in each egg capsule. It differes from *Raillietina (Raillietina) collinia* Webster, 1944 in having a larger rostellum, larger rostellar hooks and smaller cirrus pouch. From *Raillietina (Raillietina) congolensis* Baer *et* Fain, 1955 it differs in having larger sucker spines, arranged in fewer rows, fewer testes, larger rostellar hooks and a smaller cirrus pouch. From *Raillietina (Raillietina) flaminata* Meggitt, 1931 it differs in having smaller scolex, larger rostellar hooks and smaller cirrus pouch. From *Raillietina (Raillietina) torquata* (Meggitt, 1924) the present form differs in having larger scolex, larger suckers, larger rostellum, fewer and larger rostellar hooks, and smaller cirrus pouch. From *Raillietina (Raillietina) torquata rajae* Tubangui *et* Masilungan ,1937 it differs in having larger scolex, larger rostellum, larger rostellar hooks, smaller cirrus pouch and smaller eggs.

It is thus evident that the present form possesses characters justifying the creation of a distinct new species, *Raillietina (Raillietina) lalitpurensis* n. sp.

Host – *Streptopelia sengalensis* (Linnaeus)

Habitat – Intestine

Locality – Lalitpur,

Table 7. Comparison of the characters of the species closer to *Raillietina (Raillietina) lalitpurensis*, n. sp.

Charecters	*Raillietina(R) ceylonica* (Baczynska, 1914)	*Raillietina(R) collinia*, Webster,1944	*Raillietina(R) congolensis* Baer et Fain,1955	*Raillietina(R) flaminata* Meggitt, 1931	*Raillietina(R) torquata* Meggitt, 1924	*Raillietina(R) torquata rajae* Tubangui et Masilungan,1937	Present form
Strobila Length	30 – 40	60 - 90	40	50	230	150	27 - 33
Width	1.328	-	1.2	0.6	2.5	1.35	0.87
Scolex width	0.4	0.202 – 0.238	-	0.72	0.09 – 0.095	0.15 – 0.17	0.204 –0.21
Sucker diam.	0.13	-	-	-	0.035	0.04 – 0.06	0.048 – 0.07 x 0.045 – 0.08
Sucker spines Rows	-	4 – 5	6 – 8	-	5	5	4 – 5
Length	-	0.007 – 0.009	0.005	-	-	-	0.009
Rostellum diam.	0.052	0.051 – 0.06	0.1 – 0.13	-	0.09 – 0.095	0.05 – 0.07	0.12 – 0.14
Rosteller hooks Number	120	100 – 108	100 – 130	-	150	150	108 – 120
Rows	2	2	-	-	2	2	2
Length	-	0.0113 – 0.012	0.008 – 0.01	0.009	0.007 – 0.0075	0.0077	Ant. 0.018 – 0.024 Post. 0.015 – 0.02
Testes Number	Few	-	14 – 18	5 – 9	8 – 10	7 – 10	9 – 10
Cirrus pouch	0.13 x 0.031	0.07 – 0.08 x 0.04 – 0.047	0.07 – 0.09 x 0.035 – 0.04	0.11 – 0.13 x 0.04 – 0.06	0.09 x 0.03	0.14 – 0.16	0.057 – 0.066 x 0.027 – 0.03
Position of genital pore	Ant -. middle	-	Ant-. middle	Ant.- middle	Middle	Middle	Middle
No. of eggs per egg capsule	6 – 10	4 – 6	5 – 7	2 – 6	3 – 5	2 – 6	4 – 7
Egg	0.028	-	-	-	-	0.042 – 0.05	0.015 – 0.035 x 0.01 – 0.03

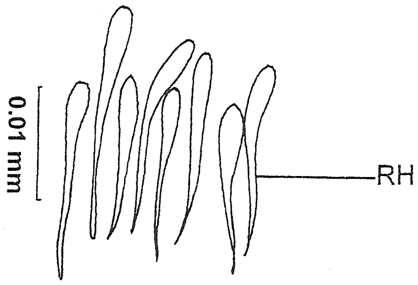

Fig. (b)

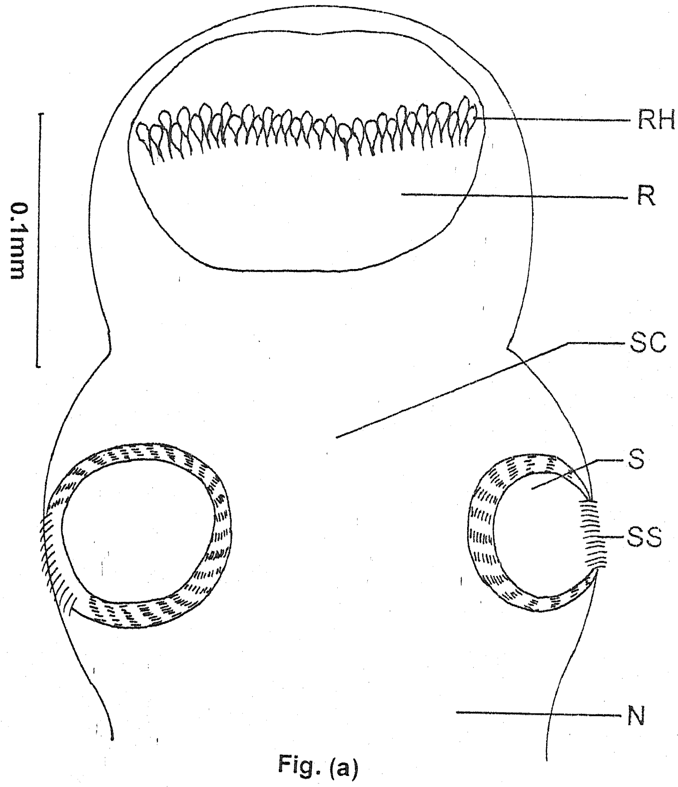

Fig. (a)

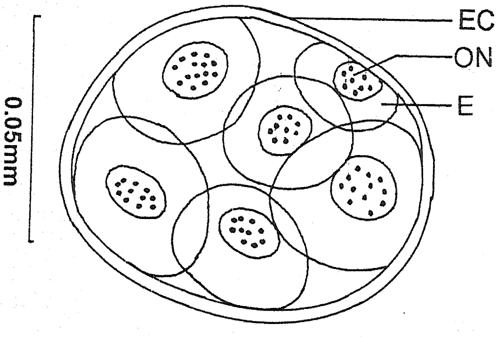

Fig. (e)

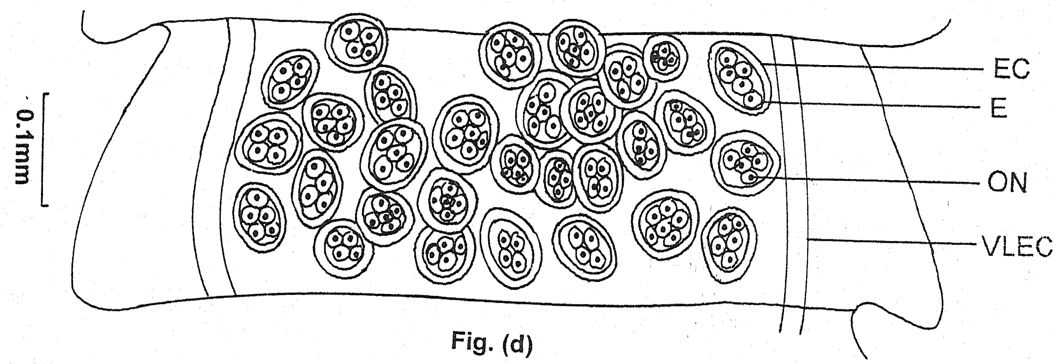

Fig. (d)

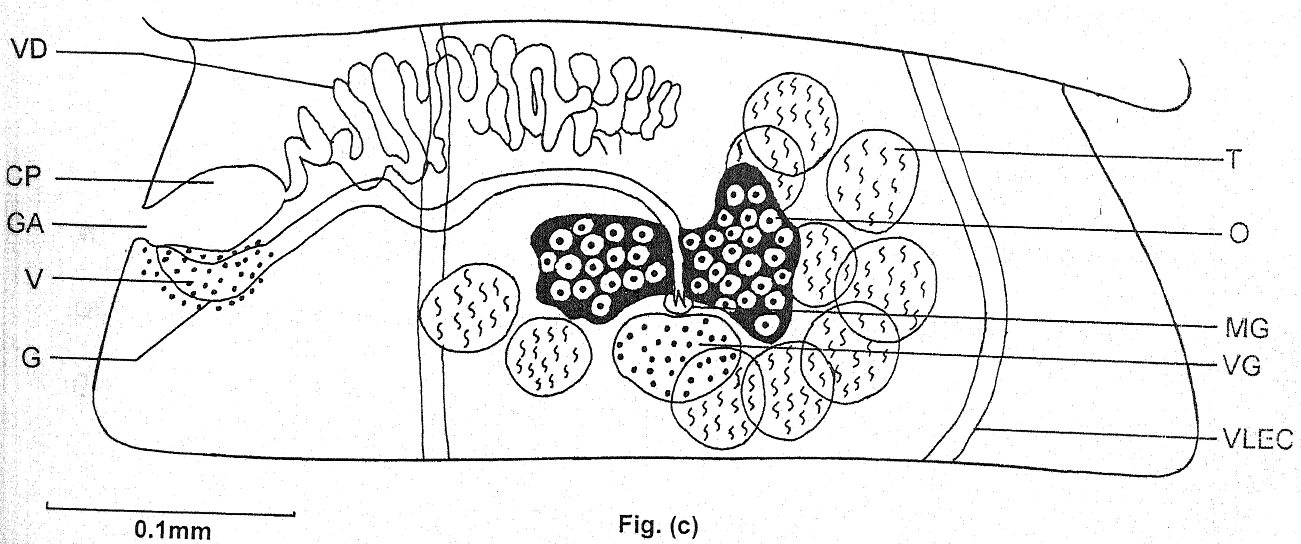

Fig. (c)

PLATE: 4

Family - Davaineidae Führmann, 1907

Subfamily - Davaineinae Braün, 1900

Genus - *Raillietina* Führmann, 1920

Subgenus - *Raillietina* Führmann, 1900

Species - *Raillietina* (*Raillietina*) *tetragona* (Molin, 1858)

Plate No. 5

Out of fifteen domestic fowls, *Gallus gallus* (Linneaus) examined, two were found infected with eight cestodes of the present species. The cestodes were present in the intestine of the host. Morphological studies of the cestodes revealed them to belong to the species *Raillietina* (*R.*) *tetragona* (Molin, 1858) of the subgenus *Raillietina* Führmann,1900, of the genus *Raillietina* Führmann, 1920, subfamily Davaineinae Braun, 1900, and the family Davaineidae Führmann,1907.

Worms measure 38-70 (54) in length and 1.70 in the maximum width as seen in the gravid proglottid. Strobila consists of a number of proglottids, all broader than long. Scolex measures 0.22 - 0.25 x 0.174 - 0.178(0.234 x 0176), not much demarcated from the neck.

Suckers four oval, longer than broad, measure 0.142 - 0.152 x 0.054 - 0.06 (0.148 x 0.056). Suckers armed with 8-12 (10) rows of marginal spines, which measure 0.0016 in length. Rostellum discoid, measures 0.032 - 0.033 x 0.048 - 0.0512 (0.032 x 0.0502). Rostellar hooks number 100-120(110), 0.0032 long and arranged in a single row.

Neck measures 1.55-1.59 x 0.21-0.225 (1.57 x 0.217). Proglottids craspedote. Immature proglottids measure 0.02 - 0.075 x 0.21 - 0.255 (0.475 x 0.232); mature proglottids measure 0.135 - 0.285 x 0.435 - 1.14 (0.212 x 0.787) and the gravid proglottids 0.27 - 0.75 x 1.425 - 1.71 (0.51 x 1.56).

Testes 20-30 (25) in each proglottid, arranged in two groups, one on each side of female genitalia. Poral group contains 7-8 testes while aporal group contains 14 - 22 testes.Laterally the testes do not extend beyond the ventral longitudinal excretory canals.

Testes measure 0.04 - 0.06 (0.05) in diameter. Cirrus pouch short, measures 0.08-0.12 x 0.045 - 0.06 (0.106 x 0.052). It does not reach up to the poral ventral longitudinal excretory canal. Vas deferens slightly sinuous. External and internal vesicula seminalis absent.

Female genitalia located in the middle of the proglottid. Ovary 0.10 - 0.16 (0.13) wide, digitate and and fan-shaped. Vitelline gland post ovarian, compact, measures 0.045-0.06 x 0.06-0.075 (0.05 x.0.06). Vagina divisible into conducting and copulatory regions. Conducting region measures 0.015 - 0.022 (0.0187) in diameter and the copulatory region 0.02 - 0.05 (0.035) in diameter. Receptaculum seminis absent.

Genital atrium prominent, measures 0.045 - 0.05 (0.047) in width and 0.015 - 0.022 (0.0185) in depth. Genital openings unilateral and situated in the anterior half of the proglottid margin.

Uterus replaced by egg capsules. Each gravid proglottid possesses 50 - 60 (55) egg capsules. Egg capsules measures 0.135-0.19 x 0.12-0.165 (0.162 x.0.142), distributed within the limits of the ventral longitudinal excretory canals. Each egg capsules contains 6-10 (8) eggs which measure 0.04 - 0.05 x 0.03-0.037 (0. 045 x 0.033).

Ventral longitudinal excretory canals measure 0.03 - 0.045 (0.037) in diameter. Dorsal longitudinal excretory canals and transverse excretory canals not seen.

DISCUSSION

The present form comes very close to *Raillietina* (*Raillietina*) *tetragona* (Molin, 1858). However, it differs slightly from *R.(R.) tetragona* (Molin,1858) in having smaller sucker spines, more and smaller rostellar hooks and in the possession of oval suckers.

It is therefore concluded that the present form should be considered a local strain of *Raillietina (R.) tetragona* (Molin,1858). It happens to be the first report of the species from Jhansi region.

Host - *Gallus gallus* (Linneaus)

Habitat - Intestine

Locality - Jhansi (U.P.)

Table 8. Comparison of the characters of the present form with *Raillietina (Raillietina) tetragona* (Molin, 1858) .

Characters	*Raillietina (Raillietina) tetragona* (Molin, 1858)	Present Form.
Strobila		
Length	250 - 335	38 – 70
Width	1.7 – 4.0	1.71
Scolex width	0.175 – 0.35	0.174 – 0.178
Sucker diam.	0.09 – 0.11	0.142 – 0.152 x 0.054 – 0.06
Shape	Round	Oval
Sucker spines		
Rows	8 – 10	8 – 12
Length	0.006 – 0.008	0.0016
Rostellum diam.	0.005 – 0.06	0.048 – 0.512
Rosteller hooks		
Number	100	100 – 120
Row	1	1
Length	0.006 – 0.008	0.0032
Neck width	0.08 – 0.1	0.21 – 0.225
Position of genital pore	Anterior to middle	Anterior half
Testes		
Number	20 – 30	20 – 30
Diameter	-	0.045 – 0.06
Cirrus pouch length	0.075 – 0.1	0.08 – 0.12 x 0.045 – 0.06
Number of eggs in each capsule	6 – 12	6 – 10
Egg diameter	0.057 – 0.063	0.04 – 0.05 x 0.03 – 0.03

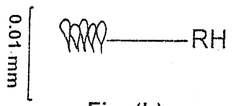

Fig. (b)

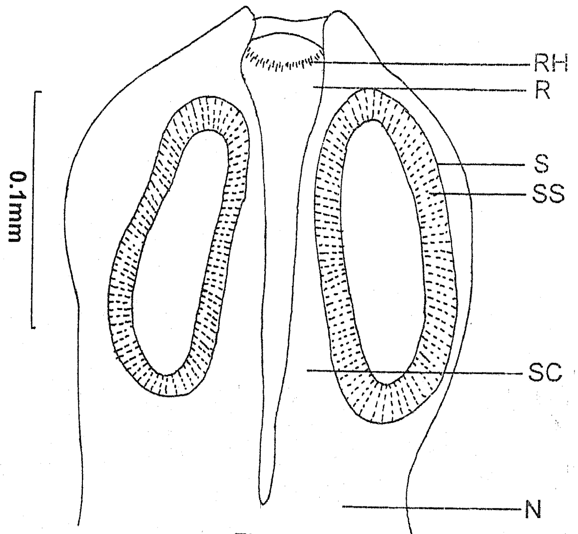

Fig. (a)

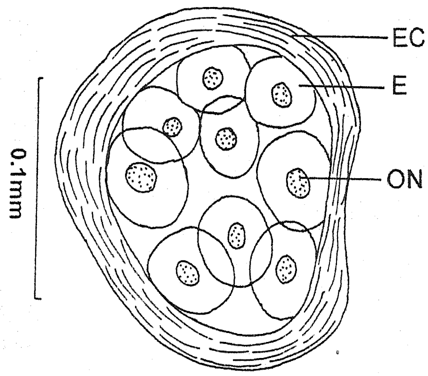

Fig. (e)

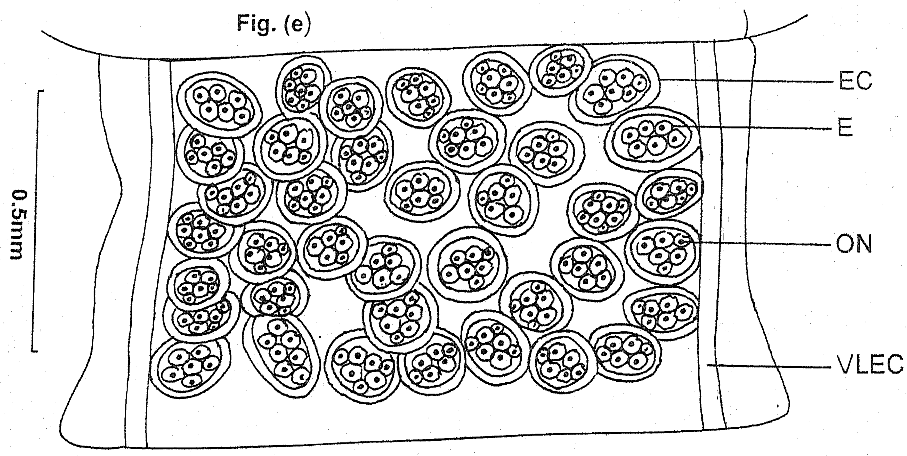

Fig. (d)

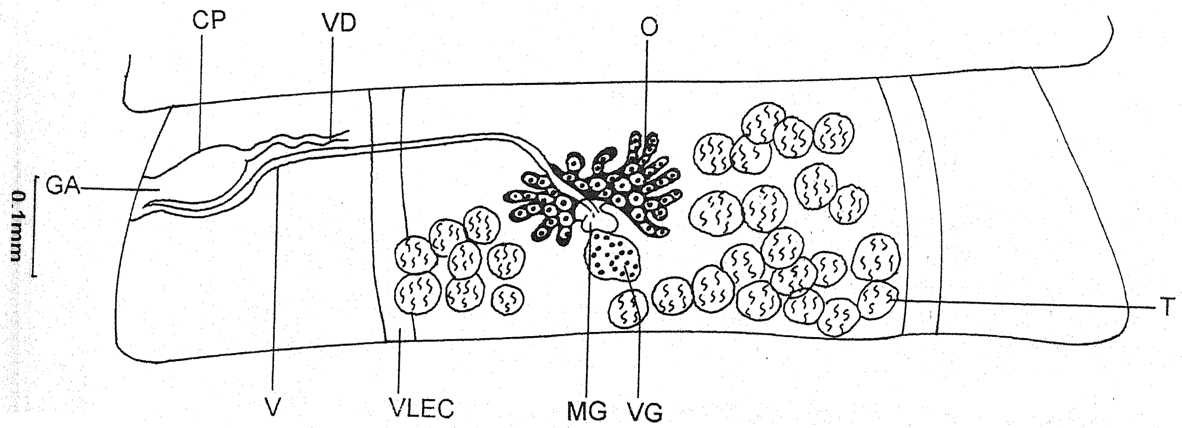

Fig. (c)

PLATE: 5

Family	-	Davaineidae Führmann, 1907
Subfamily	-	Davaineinae Braün, 1900
Genus	-	*Raillietina* Führmann, 1920
Subgenus	-	*Führmannetta* Stiles and Orlemann,1926
Species	-	*Raillietina (Führmannetta) baruasagari* n.sp.

Plate No. 6

One out of seven little brown dove, *Streptopelia sengalensis* (Linnaeus) was examined and found infected with twenty cestodes. The morphological studies of the cestode parasites revealed them to belong to the subgenus *Fuhrmannetta* Stiles and Orlemann,1926 of the genus *Raillietina* Führmann, 1920 belonging to the subfamily Davaineinae Braün, 1900,family Davaineidae Führmann, 1907.

The cestodes are medium in size measuring 5.0 - 15.0 cm. (10 cm.) in length and 0.94 in maximum breadth which is seen in the gravid proglottids.The strobila consists of a number of proglottids, the immature, mature and the anterior gravid proglottids are broader

than long while the posterior gravid proglottids are almost square or even longer than broad.

The scolex is well demarcated from the neck. The scolex measure 0.076 - 0.078 x 0.11 - 0.13 (0.077 x 0.12). It is provided with four oval suckers measuring 0.02 - 0.03 (0.025). The suckers are armed with 2-6 rows of spines measuring 0.002 in length.

The rostellum is discoid and broader than long. It measures 0.024 - 0.026 x 0.034 -0.036 (0.025 x 0.035). The rostellum is provided with about 320 pin shaped hooks, arranged in two alternate rows. The rostellar hooks of the anterior row measure 0.007 while those of the posterior row measure 0.006 in length.

The scolex is followed by a prominent neck that is 1.02 in length. The proglottids are craspedote. The immature proglottids measure 0.02 - 0.22 x 0.18 - 0.36 (0.12 x 0.27). The mature proglottids are 0.22 - 0.38 x 0.44 - 0.82 (0.30 x 0.63). The gravid proglottids are 0.38 - 0.82 x 0.70 - 0.94 (0.60 x 0.82).

The testes are oval to round, encircling the female genital organs except at the region of genital ducts. Laterally, the testes do not extend beyond the longitudinal excretory canals. The testes number 8 - 12 (10) in each proglottid and measure 0.042 - 0.066

(0.054) in diameter. The cirrrus pouch is oval, measuring 0.10 - 0.16 x 0.04 - 0.08 (0.13 x 0.06). It is directed obliquely anteriorwards. It reaches upto the ventral longitudinal excretory canal but never crosses it. The vas deferens forms several coils before entering the cirrus pouch and is surrounded by many gland cells, throughout its length. The internal and external vesicula seminalis are absent. The cirrus could not be seen.

The female genitalia are medial. The ovary is measuring 0.06 - 0.10 (0.08) across. The vitelline gland is compact, measuring 0.04 - 0.06 (0.05) across. It is situated posterior to the ovary. The vagina measures 0.01 - 0.02 (0.015) in diameter. The receptaculum seminis is absent.

The genital atrium is shallow measuring 0.035 - 0.052 (0.043) in width and 0.014 - 0.016 (0.015) in depth. The genital pores are irregularly alternating, located approximately at the posterior border of the anterior half of the proglottid margin.

The uterus breaks down in egg-capsules which remain scattered throughout the proglottid but do not pass laterally, beyond the longitudinal excretory canals. The egg-capsules number 26 - 62 (44) in each gravid proglottid and measure 0.065 - 0.12 (0.092) in

diameter. Each egg-capsule contains 6-12 (9) eggs measuring 0.02 - 0.05 (0.035) in diameter.

The ventral longitudinal excretory canals measure 0.010 - 0.024 (0.017) in diameter while the dorsal longitudinal excretory canals are narrower measuring 0.004 - 0.0076 (0.0058) in diameter. The dorsal longitudinal excretory canals run inner to the ventral longitudinal excretory canals. The former are slightly sinuous while the latter are almost straight. The transverse excretory canals are absent.

DISCUSSION

A comparison of the present form with the reported species of *Raillietina (Fuhrmannetta)* Stiles and Orlemann, 1926 reveals, its closeness to *R. (F). leptotrachela* (Hungerbühler, 1910) and *R.(F.) nepalis* (Sharma, 1943).

However it differs from *R (F.) leptotrachela* (Hungerbühler,1910) in having longer strobila, smaller scolex, smaller suckers, smaller rostellum, fewer and smaller rostellar hooks, fewer testes and more eggs per egg capsule. From *R. (F.)nepalis* Sharma, 1943, the present form differs in having longer strobila, smaller scolex , presence of sucker spines, smaller rostellum, more

of smaller rostellar hooks, smaller cirrus pouch, fewer testes and more eggs per egg capsule.

In light of above discussion it is proposed to accommodate the present form as a new species *Raillietina (Führmannetta) baruasagari* n.sp.

Host – *Streptopelia sengalensis* (Linnaeus)

Habitat = Intestine

Locality – Baruasagar (Jhansi).

Table 9. Comparison of the characters of the species closer to *Raillietina (Fuhrmannetta)baruasagari*, n. sp.

Characters	*R. (F.) leptotrachela* (Hungerbühler, 1910)	*R. (F.) nepalis* (Sharma, 1943)	Present form
Strobila			
Length	390	160 - 180	5 – 15 cm
Width	-	0.7	0.94
Scolex width	0.375	0.16	0.11 – 0.13
Sucker diam.	0.14	0.026	0.02 – 0.03
Sucker spines	-	Absent	3 – 6 rows
Rostellum diam.	0.104	0.038	0.034 – 0.036
Rosteller hooks			
Number	84	28 - 36	320
Size	0.013	0.012	0.0016 – 0.0017
Testes Number	20 - 30	14 - 18	8 – 12
Cirrus pouch	0.15 x 0.075	0.215 x 0.035	0.10 – 0.16 x 0.04 – 0.08
Number of eggs in each capsule	3 - 4	3 - 5	6 - 12

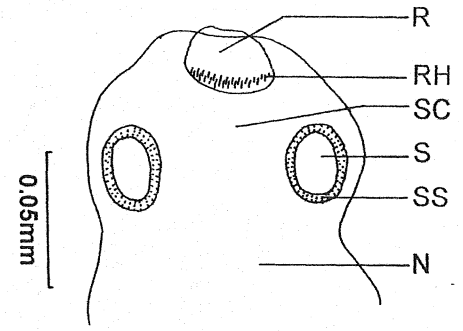

Fig. (a)

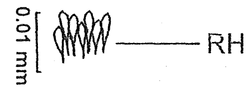

Fig. (b)

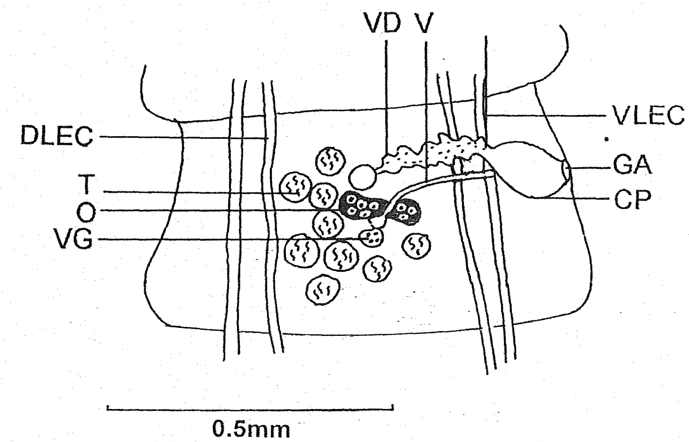

Fig. (c)

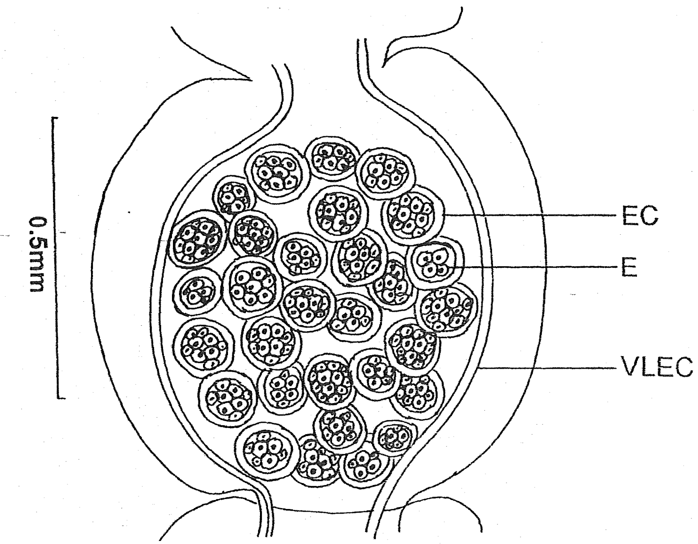

Fig. (d)

PLATE: 6

Family	-	Davaineidae Führmann, 1907
Subfamily	-	Davaineinae Braün, 1900
Genus	-	*Raillietina* Führmann, 1920
Subgenus	-	*Führmannetta,* Stiles and Orlemann, 1926
Species	-	*Raillietina(Führmannetta) jhansiensis* n.sp.

Plate No. 7

Out of the twenty three pigeons, *Columba livia* (Gmelin) examined, one was found infected with seven cestodes of the species described herein. The cestodes were present in the intestine of the pigeon. The morphological studies of the cestodes revealed them to belong to the subgenus *Führmannetta* Stiles and Orlemann,1926 of the genus *Raillietina* Führmann, 1920 of the subfamily Davaineinae Braün, 1900, family Davaineidae Führmann, 1907.

The cestodes are medium in size measuring 7.0 - 13.0 cm. (10 cm.) in length and 1.98 in the maximum breadth which is attained by the gravid proglottids. The strobila consists of a large number of proglottids, all broader than long.

The scolex is well demarcated from the neck. The scolex measures 0.32 - 0.35 x 0.37 - 0.40 (0.335 x 0.385). It is provided with four spherical suckers measuring 0.065 - 0.085 (0.075) in diameter. The suckers are armed with 5-7 rows of spines measuring 0.0022 - 0.0033 (0.00275) in length. The rostellum is discoid and broader than long. It measures 0.077 - 0.10 x 0.18 -0.20 (0.093 x 0.19). The rostellum is provided with 120 hooks, arranged in two alternate rows. The hooks of the anterior row measure 0.0155 - 0.02 while those of the posterior row are smaller measuring 0.0135 - 0.0138 in length. The hooks are hammer shaped.

A neck measuring 1.85 in length follows the scolex. The proglottids are craspedote. The immature proglottids measure 0.068 - 0.196 x 0.284 - 0.442 (0.13 x 0.363), the mature proglottids measure 0.218 - 0.504 x 0.614 - 1.22 (0.361x 0.917) while the gravid proglottids are 0.728 - 0.982 x 1.62 - 1.98 (0.855 - 1.8).

The testes are oval to round and are present posterolaterally to the female genitalia, almost encircling the latter from three sides. Laterally the testes do not extend beyond the ventral longitudinal excretory canals. The testes number 23 - 26 (25) in each proglottid and measure 0.042 - 0.064 (0.053) in diameter. The cirrus pouch is

elongate measuring 0.10 - 0.15 x 0.032 - 0.042 (0.125 x 0.037). It does not reach upto the poral ventral longitudinal excretory canal. The vas deferens forms several coils before entering the cirrus pouch. The internal and external vesicula seminales are absent. The cirrus could not be seen.

The female genitalia are medial. The ovary is multilobed, measuring 0.13 - 0.33 (0.23) across. The vitelline gland is variously lobed, measuring 0.066 - 0.174 (0.12) across. It is present posterior to the ovary. The vagina measures 0.021 - 0.042 (0.031) in diameter, opening posterior to cirrus pouch in the genital atrium. The receptaculum seminis is absent. The genital atrium measures 0.047 - 0.111 (0.079) in width and 0.021 - 0.045 (0.033) in depth. The genital pores are irregularly alternating and located in the anterior half of the proglottid margin.

The uterus is replaced by egg-capsules. The egg-capsules number 50-70 (60) in each proglottid measuring 0.042 - 0.20 (0.126). These do not extend laterally beyond the longitudinal excretory canals. Each egg-capsules contains 2-8 (5) eggs measuring 0.034 - 0.048 (0.041) in diameter.

The ventral longitudinal excretory canals measure 0.036 - 0.15 (0.093) in diameter while the dorsal longitudinal excretory canals measure 0.021 - 0.04 (0.030) in diameter. Transverse excretory canals situated near the posterior border of each proglottid connect the ventral longitudinal excretory canals. The transverse excretory canals measure 0.042 - 0.06 (0.044) in diameter. The ventral longitudinal excretory canals follow a sinuous course while the dorsal longitudinal excretory canals run almost straight and are outer to the ventral longitudinal excretory canals.

DISCUSSION

A comparison of the present form with the reported species of *Raillietina(Fuhrmannetta)* reveals its closeness to *R.(F.) birmanica*,(Meggitt, 1926), *R.(F.) bucerotidarum* (Joyeux *et* Baer,1928), *R. (F.) leptotrachela* (Hungerbühler,1910) and *R. (F.) malakartis* (Mahon,1958).

However, the present form differs from *R. (F.) birmanica* (Meggitt,1926) in presence of sucker spines and fewer and longer rostellar hooks. The hooks of anterior row are longer than those of posterior row. From *R. (F.) bucerotidarum* (Joyeux *et* Baer, 1928) the present form differs in smaller scolex, larger rostellum, fewer and

longer rostellar hooks. It differs from *R.(F.) leptotrachela* (Hugerbühler,1910) in having smaller suckers, larger rostellum, more rostellar hooks and smaller cirrus pouch. From *R.(F.) malakartis* (Mahon ,1958) it differs in having larger scolex, larger suckers, larger rostellum and fewer and larger rostellar hooks.

In the light of the above discussion it is proposed to accommodate the present form as a new species *Raillietina(Fuhrmannetta) jhansiensis* n. sp.

Host	-	*Columba livia* (Gmelin)
Habitat	-	Intestine
Locality	-	Jhansi, U.P.

Table 10. **Comparison of the characters of the species closer to *Raillietina (Fuhrmannetta) jhansiensis*, n. sp.**

Characters	*R. (F.) birmanica* (Meggitt, 1926)	*R. (F.) bucerotidarum* (Joyeux et. Baer,1928)	*R. (F.) leptotrachela* (Hungerbühler, 1910)	*R. (F.) malakartis* (Mahon, 1958)	Present form
Strobila					
Length	8 - 10	30	390	90	7 – 13 cm
Width	1 - 2	1.5	-	2	1.98
Scolex width	-	0.45	0.375	0.153	0.37 – 0.40
Sucker diam.	-	-	0.14	0.055	0.065 – 0.085
Sucker spines	Absent	-	-	Several	5 – 7 rows
Rostellum diam.	-	0.16	0.104	0.105	0.18 – 0.20
Rosteller hooks					
Number	300	170	84	150 - 160	120
Size	0.009 – 0.012	0.003 – 0.0032	0.013	0.009 – 0.0097	0.0155 – 0.02 0.0135 – 0.0138
Testes Number	20 - 25	25	20 - 30	24 - 33	23 - 26
Cirrus pouch	-	0.12 x 0.05	0.15 x 0.075	0.149 – 0.16	0.11 – 0.15
Number of eggs in egg capsule	Several	-	3 - 4	-	2 - 8

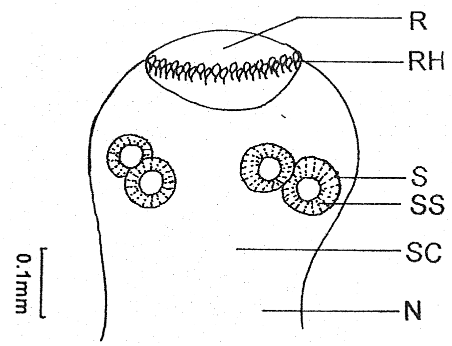

Fig. (a)

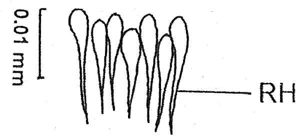

Fig. (b)

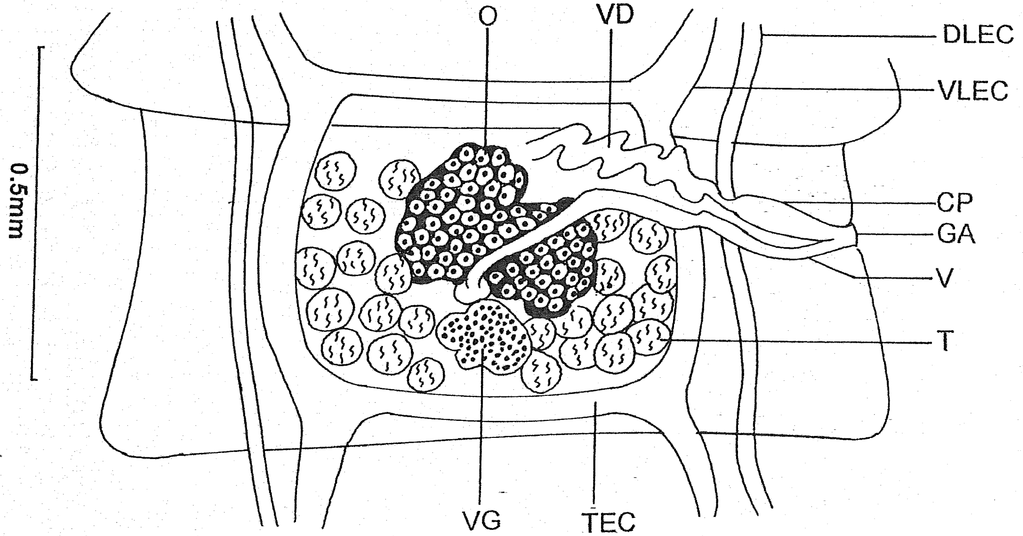

Fig. (c)

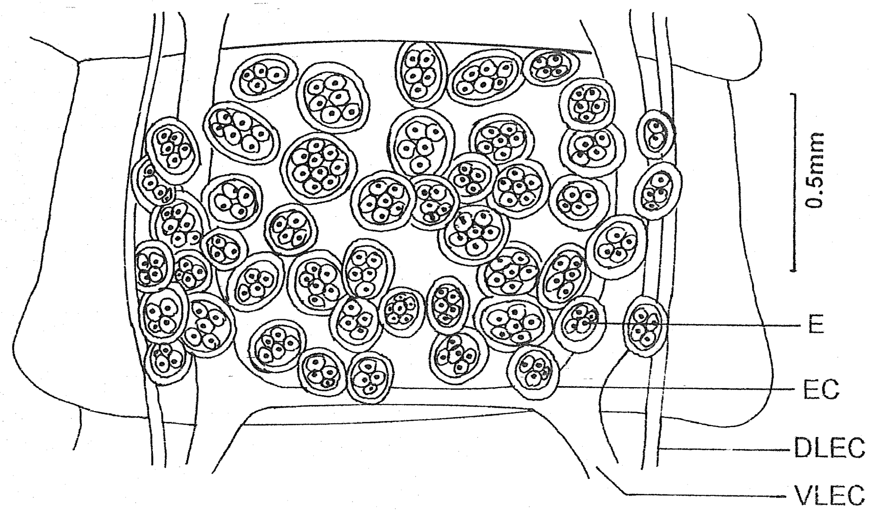

Fig. (d)

PLATE: 7

ECOLOGICAL STUDY OF HELMINTH PARASITES

AN ECOLOGICAL STUDY OF THE PREVALENCE, MEAN INTENSITY AND RELATIVE DENSITY OF THE CESTODE INFECTION IN RELATION TO THE SEX OF THE HOST IN THE PIGEON *COLUMBA LIVIA* (GMELIN) IN ALLAHABAD.

INTRODUCTION

A total of fifty seven pigeons, *Columba livia* (Gmelin) were examined and forty of them were found infected. A total number of 1455 cestode parasites were obtained from November, 97 to October, 98.

MATERIALS AND METHODS

The pigeons, *Columba livia* (Gmelin) were obtained from the local bird dealers. The alimentary canal of the host was cut open in normal saline solution. It was lightly shaken and the contents decanted several times. The intestinal contents were examined thoroughly under the binocular microscope. The cestode parasites were sorted out and counted separately. The sex of the bird was determined by the presence of testes or ovary in the abdominal cavity.

The following formulae were used in the calculation of prevalence, mean intensity and relative density of the cestode parasite monthly, seasonally and annually.

Prevalence =No. of host infected / No. of host examined

Mean Intensity = Total no. of cestodes obtained / Total no. of host infected

Relative Density = Total no. of cestodes obtained / Total no. of host examined.

OBSERVATIONS

To study the prevalence, mean intensity and relative density of cestode infection in relation to the sex of the host in the pigeon, *Columba livia* (Gmelin) from November, 97 to October,98, a total of 57 hosts were examined and 40 of them were found infected with cestodes. The total numbers of 1455 cestode parasites were obtained from the intestine of the birds.

The monthwise prevalence, mean intensity and relative density of cestode parasites have been depicted in the tables 01 and 02 and figures 01,02 03. In males the minimum prevalence is seen in December and March and maximum prevalence in November, January, May, June, July and August. The prevalence in female birds is zero in April and June and low in August. The moderate prevalence is seen in September and maximum prevalence is seen in November, December, January, February, May,July and October.

The mean intensity of cestode parasites in male birds varies from zero to 109. It is zero in February, April and September. It is low in November, December, January, March, May and June and moderate in August. The mean intensity is maximum in July. The mean intensity in the female birds is zero in April and June. It is low in November, May, July and August, moderate in January, February and September and high in October and December.

The relative density of cestode parasites in male birds varies from zero to 109. It is zero in February, April and September, low in November, December, January, March and June. It is moderate in August. The maximum relative density is seen in July. The relative density of cestode parasites in female birds is zero in April and June and low in November, May, July, August and September. The moderate relative density is seen in January and February. The maximum relative density is seen is October and December.

The seasonal prevalence, mean intensity and relative density of cestode parasites in birds are as follows:

The prevalence of cestode parasites in male birds is moderate in winter and summer seasons but maximum in rainy season. The prevalence of cestode parasites in female birds is moderate in summer season but maximum in winter and rainy seasons. (Table – 03 and figure 04).

The mean intensity of cestode parasites in male birds is low in winter and summer seasons and maximum in rainy season. The mean intensity of cestode parasites in female birds is low in summer season and moderate in winter and rainy seasons. (Table – 03 and figure 05).

The relative density of cestode parasites in male birds is low in winter and summer seasons and moderate in rainy season. The relative density of cestode parasites in female birds is low in summer season and moderate in winter and rainy seasons. (Table – 03 and figure – 06)

The annual prevalence, mean intensity and relative density of cestode parasites are higher in females than in male birds. (Table – 04 and figure – 7,8,9).

Table 1.Monthly Variations in Prevalence, Mean intensity and Relative density of Cestode Parasites of *Columba livia* in relation to the male sex of the host.

Months	No. of Host examined	No. of Host infected	No. of Cestodes obtained	Prevalence	Mean intensity	Relative density
November	1	1	4	1.0	4.0	4.0
December	4	2	53	0.5	26.5	13.2
January	4	4	55	1.0	13.7	13.7
February	2	0	0	0.0	0.0	0.0
March	5	2	6	0.4	3.0	1.2
April	2	0	0	0.0	0.0	0.0
May	2	2	3	1.0	1.5	1.5
June	4	4	53	1.0	13.2	13.2
July	2	2	218	1.0	109.0	109.0
August	2	2	92	1.0	46.0	46.0
September	1	0	0	0.0	0.0	0.0
October	0	0	0	0.0	0.0	0.0

Table 2.Monthly Variations in Prevalence, Mean intensity and Relative density of Cestode Parasites of *Columba livia* in relation to the female sex of the host.

Months	No. of Host examined	No. of Host infected	No. of Cestodes obtained	Prevalence	Mean intensity	Relative density
November	4	4	84	1.0	21.0	21.0
December	1	1	86	1.0	86.0	86.0
January	1	1	54	1.0	54.0	54.0
February	3	3	183	1.0	61.0	61.0
March	0	0	0	0.0	0.0	0.0
April	3	0	0	0.0	0.0	0.0
May	3	3	81	1.0	27.0	27.0
June	1	0	0	0.0	0.0	0.0
July	3	3	73	1.0	24.3	24.3
August	3	1	10	0.3	10.0	3.3
September	2	1	30	0.5	30.0	15.0
October	4	4	354	1.0	88.5	88.5

Table 3.Seasonal Variations in Prevalence, Mean intensity and Relative density of Cestode Parasites of *Columba livia* in relation to the sex of the host.

Sex	Seasons	No. of Host examined	No. of Host infected	No. of Cestodes obtained	Prevalence	Mean intensity	Relative density
Male	Winter	11	7	112	0.63	16.00	10.10
Male	Summer	13	8	62	0.61	7.75	4.70
Male	Rainy	5	4	310	0.80	77.50	62.00
Female	Winter	9	9	406	1.00	45.10	45.10
Female	Summer	7	3	81	0.42	27.00	11.50
Female	Rainy	12	9	467	0.75	51.80	38.90

Table 4.Annual Variations in Prevalence, Mean intensity and Relative density of Cestode Parasites of *Columba livia* in relation to the male and female sex of the host.

Sex	No. of Host examined	No. of Host infected	No. of Cestodes obtained	Prevalence	Mean intensity	Relative density
Male	29	19	484	0.65	25.40	16.60
Female	28	21	954	0.75	45.40	34.00

DISCUSSION

It appears from the present observations that the prevalence, mean intensity and relative density of cestode parasites in birds is higher in females than in males. It may also be related to the reduced resistance in female birds caused by greater stress placed on them because of the frequent changes in their hormonal and metabolic activities during their active reproductive period of life.

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OBSERVATIONS

Common Wall Lizard, *Hemidactylus flaviviridis* (Ruppel)

In the present studies of *Hemidactylus flaviviridis* (Ruppel), a total number of 70 hosts were examined and 462 helminth parasites were obtained from the gall bladder and intestine of the hosts. They include 34 cestodes, 107 trematodes, 321 nematodes and no acanthocephala. The wall lizards were not available in the month of January and February possibly due to dormant conditions.

PREVALENCE

Average monthwise variations of :

Cestode : Table – 11, 12. Figure – 1.

The monthwise prevalence in male lizards is zero in May, August and September and low in June and July. The prevalence is moderate in October, November, December, March and April.

The monthwise prevalence in female lizards is zero in December, March, April, May and September and low in October and November. The prevalence is moderate in June, July and August.

Trematode : Table – 13, 14. Figure – 2.

The monthwise prevalence in male lizards is zero in December, April and August and low in November. The

prevalence is moderate in October, March, May, June, July and September.

The monthwise prevalence in female lizards is zero in December, April and May and is low in October, November, March, June, July, August and September.

Nematode : Table – 15, 16. Figure – 3.

The monthwise prevalence in male lizards is moderate in May and high in October, November, December, March, April, June, July, August and September.

The monthwise prevalence in female lizards is moderate in October and high in November, December, March, April, May, June, July, August and September.

Acanthocephala :

The monthwise prevalence is zero in both the male and female lizards in all the months of the year from October to September.

Helminth : Table – 17, 18. Figure – 4.

The monthwise prevalence in male lizards is moderate in May and high in October, November, December, March, April, June, July, August and September.

The monthwise prevalence in female lizards is moderate in October and high in November, December, March, April, May, June, July, August and September.

Average seasonal variations of :

Cestode : Table –19. Figure – 5.

The seasonal prevalence in male lizards is low in summer and rainy seasons and moderate in winter season of the year.

The seasonal prevalence in female lizards is zero in summer and low in winter and rainy seasons of the year.

Trematode : Table – 20. Figure – 6.

The seasonal prevalence in male lizards is low in winter and summer seasons and moderate in rainy season of the year.

The seasonal prevalence in female lizards is low in summer and moderate in winter and rainy seasons of the year.

Nematode : Table – 21. Figure – 7.

The seasonal prevalence in male lizards is high in winter, summer and rainy seasons of the year.

The seasonal prevalence in female lizards is also high in winter, summer and rainy seasons of the year.

Acanthocephala :

The seasonal prevalence is zero in both the male and female lizards in all the seasons of the year.

Helminth : Table – 22. Figure – 8.

The seasonal prevalence in both the male and female lizards is high in winter, summer and rainy seasons of the year.

Average annual variations of :

Cestode : Table – 23. Figure – 9.

The annual prevalence is moderate in male lizards and low in female lizards. The prevalence is higher in males than the females.

Trematode : Table – 24. Figure – 10.

The annual prevalence is moderate in both the male and female lizards. The prevalence is higher in females than the males.

Nematode : Table – 25.Figure – 11.

The annual prevalence is high in both the male and female lizards. The prevalence is higher in males than the females.

Acanthocephala :

The annual prevalence is zero in both the male and female lizards.

Helminth : Table – 26. Figure – 12.

The annual prevalence is high in both the male and female lizards. The prevalence is higher in males than the females.

MEAN INTENSITY

Average monthwise variations of :

Cestode : Table – 11, 12. Figure – 13.

The monthwise mean intensity in male lizards is zero in May, August and September and low in October, November, December, March, April, June and July.

The monthwise mean intensity in female lizards is zero in December, March, April, May and September and low in October, November, June, July and August.

Trematode : Table – 13, 14. Figure – 14.

The monthwise mean intensity in male lizards is zero in December, April and August and low in October, November, March, May, June, July and September.

The monthwise mean intensity in female lizards is zero in December, April and May and low in October. The

mean intensity is moderate in November, March, June, August and September and high in July.

Nematode : Table – 15,16. Figure – 15.

The monthwise mean intensity in male lizards is low in October, November, December, March, April, May, June, July, August and September.

The monthwise mean intensity in female lizards is also low in October, November, December, March, April, May, June, July, August and September.

Acanthocephala :

The monthwise mean intensity is zero in both the male and female lizards in all the months of the year from October to September.

Helminth : Table – 17, 18. Figure – 16.

The monthwise mean intensity in male lizards is low in October, November, December, March, April, May, June, July, August and September.

The monthwise mean intensity in female lizards is also low in October, November, December, March, April, May, June, July, August and September

Average seasonal variations of :

Cestode : Table – 19. Figure – 17.

The seasonal mean intensity in male lizards is low in winter, summer and rainy seasons of the year.

The seasonal mean intensity in female lizards is zero in summer and low in winter and rainy seasons of the year.

Trematode : Table – 20. Figure – 18.

The seasonal mean intensity in male lizards is low in winter, summer and rainy seasons of the year.

The seasonal mean intensity in female lizards is also low in winter, summer and rainy seasons of the year.

Nematode : Table – 21. Figure – 19.

The seasonal mean intensity in male lizards is low in winter, summer and rainy seasons of the year.

The seasonal mean intensity in female lizards is also low in winter, summer and rainy seasons of the year.

Acanthocephala :

The seasonal mean intensity is zero in both the male and female lizards in all the seasons of the year.

Helminth : Table – 22. Figure – 20.

The seasonal mean intensity in male lizards is low in winter, summer and rainy seasons of the year.

The seasonal mean intensity in female lizards is also low in winter, summer and rainy seasons of the year.

Average annual variations of :

Cestode : Table – 23.Figure – 21.

The annual mean intensity is low and almost equal in both the male and female lizards.

Trematode : Table – 24. Figure – 22.

The annual mean intensity is low in both the male and female lizards. The mean intensity is higher in females than the males.

Nematode : Table – 25.Figure – 23.

The annual mean intensity is low and almost equal in both the male and female lizards

Acanthocephala :

The annual mean intensity is zero in both the male and female lizards.

Helminth : Table – 26.Figure – 24.

The annual mean intensity is low in both the male and female lizards. The mean intensity is slightly higher in females than the males.

RELATIVE DENSITY

Average monthwise variations of :

Cestode : Table – 11, 12. Figure – 25.

The monthwise relative density in male lizards is zero in May, August and September and low in October, November, December, March, April, June and July.

The monthwise relative density in female lizards is zero in December, March, April, May and September and low in October, November, June, July and August.

Trematode : Table – 13, 14. Figure – 26.

The monthwise relative density in male lizards is zero in December, April and August and low in October, November, March, May, June, July and September.

The monthwise relative density in female lizards is zero in December, April and May and low in October, November, March, June, July, August and September.

Nematode : Table – 15, 16. Figure – 27.

The monthwise relative density in male lizards is low in October, November, December, March, April, May, June, July, August and September.

The monthwise relative density in female lizards is also low in October, November, December, March, April, May, June, July, August and September.

Acanthocephala :

The monthwise relative density is zero in both the male and female lizards in all the months of the year from October to September.

Helminth : Table – 17, 18. Figure – 28.

The monthwise relative density in male lizards is low in October, November, December, March, April, May, June, July, August and September.

The monthwise relative density in female lizards is also low in October, November, December, March, April, May, June, July, August and September.

Average seasonal variations of :

Cestode : Table – 19. Figure – 29.

The seasonal relative density in male lizards is low in winter, summer and rainy seasons of the year.

The seasonal relative density in female lizards is zero in summer and low in winter and rainy seasons of the year.

Trematode : Table – 20. Figure – 30.

The seasonal relative density in male lizards is low in winter, summer and rainy seasons of the year.

The seasonal relative density in female lizards is also low in winter, summer and rainy seasons of the year.

Nematode : Table – 21. Figure – 31.

The seasonal relative density in male lizards is low in winter, summer and rainy seasons of the year.

The seasonal relative density in female lizards is also low in winter, summer and rainy seasons of the year.

Acanthocephala :

The seasonal relative density is zero in both the male and female lizards in all the seasons of the year.

Helminth : Table – 22. Figure – 32.

The seasonal relative density in male lizards is low in winter, summer and rainy seasons of the year.

The seasonal relative density in female lizards is also low in winter, summer and rainy seasons of the year.

Average annual variations of :

Cestode : Table – 23. Figure – 33.

The annual relative density is low in both the male and female lizards. The relative density is higher in males than the females.

Trematode : Table – 24. Figure – 34.

The annual relative density is low in both the male and female lizards. The relative density is slightly higher in females than the males.

Nematode : Table – 25. Figure – 35.

The annual relative density is low in both the male and female lizards. The relative density is slightly higher in males than the females.

Acanthocephala :

The annual relative density is zero in both the male and female lizards.

Helminth : Table – 26. Figure – 36.

The annual relative density is low in both the male and female lizards. The relative density is slightly higher in males than the females.

Table 11. Average Monthwise Variations in Prevalence, Mean intensity and Relative density of Cestode Parasites of *Hemidactylus flaviviridis* (Male).

Months	No. of Host examined	No. of Host infected	No. of Cestodes obtained	Prevalence	Mean intensity	Relative density
October	3	2	2	0.66	1.00	0.66
November	4	2	7	0.50	3.50	1.75
December	2	1	2	0.50	2.00	1.00
January	0	0	0	0.00	0.00	0.00
February	0	0	0	0.00	0.00	0.00
March	5	2	3	0.40	1.50	0.60
April	2	1	1	0.50	1.00	0.50
May	3	0	0	0.00	0.00	0.00
June	4	1	4	0.25	4.00	1.00
July	4	1	2	0.25	2.00	0.50
August	1	0	0	0.00	0.00	0.00
September	2	0	0	0.00	0.00	0.00

Table 12. Average Monthwise Variations in Prevalence, Mean intensity and Relative density of Cestode Parasites of *Hemidactylus flaviviridis* (Female).

Months	No. of Host examined	No. of Host infected	No. of Cestodes obtained	Prevalence	Mean intensity	Relative density
October	4	1	5	0.25	5.0	1.25
November	7	1	2	0.14	2.0	0.28
December	3	0	0	0.00	0.0	0.00
January	0	0	0	0.00	0.0	0.00
February	0	0	0	0.00	0.0	0.00
March	8	0	0	0.00	0.0	0.00
April	2	0	0	0.00	0.0	0.00
May	3	0	0	0.00	0.0	0.00
June	3	1	1	0.33	1.0	0.33
July	2	1	1	0.50	1.0	0.50
August	4	2	4	0.50	2.0	1.00
September	4	0	0	0.00	0.0	0.00

Table 13. Average Monthwise Variations in Prevalence, Mean intensity and Relative density of Trematode Parasites of *Hemidactylus flaviviridis* (Male).

Months	No. of Host examined	No. of Host infected	No. of Trematodes obtained	Prevalence	Mean intensity	Relative density
October	3	1	4	0.33	4.0	1.33
November	4	1	3	0.25	3.0	0.75
December	2	0	0	0.00	0.0	0.00
January	0	0	0	0.00	0.0	0.00
February	0	0	0	0.00	0.0	0.00
March	5	2	4	0.40	2.0	0.80
April	2	0	0	0.00	0.0	0.00
May	3	1	1	0.33	1.0	0.33
June	4	2	4	0.50	2.0	1.00
July	4	2	9	0.50	4.5	2.25
August	1	0	0	0.00	0.0	0.00
September	2	2	9	1.00	4.5	4.50

Table 14. Average Monthwise Variations in Prevalence, Mean intensity and Relative density of Trematode Parasites of *Hemidactylus flaviviridis* (Female).

Months	No. of Host examined	No. of Host infected	NO. OF Trematodes obtained	Prevalence	Mean intensity	Relative density
October	4	1	3	0.25	3.00	0.75
November	7	4	10	0.57	2.50	1.42
December	3	0	0	0.00	0.00	0.00
January	0	0	0	0.00	0.00	0.00
February	0	0	0	0.00	0.00	0.00
March	8	3	11	0.37	3.66	1.37
April	2	0	0	0.00	0.00	0.00
May	3	0	0	0.00	0.00	0.00
June	3	2	28	0.66	14.00	9.33
July	2	2	7	1.00	3.50	3.50
August	4	2	10	0.50	5.00	2.50
September	4	2	4	0.50	2.00	1.00

Table 15. Average Monthwise Variations in Prevalence, Mean intensity and Relative density of Nematode Parasites of *Hemidactylus flaviviridis* (Male).

Months	No. of Host examined	No. of Host infected	No. of Nematodes obtained	Prevalence	Mean intensity	Relative density
October	3	3	15	1.00	5.00	5.00
November	4	4	20	1.00	5.00	5.00
December	2	2	8	1.00	4.00	4.00
January	0	0	0	0.00	0.00	0.00
February	0	0	0	0.00	0.00	0.00
March	5	5	11	1.00	2.20	2.20
April	2	2	7	1.00	3.50	3.50
May	3	2	16	0.66	8.00	5.33
June	4	4	26	1.00	6.50	6.50
July	4	4	22	1.00	5.50	5.50
August	1	1	14	1.00	14.00	14.00
September	2	2	6	1.00	3.00	3.00

Table 16. Average Monthwise Variations in Prevalence, Mean intensity and Relative density of Nematode Parasites of *Hemidactylus flaviviridis* (Female).

Months	No. of Host examined	No. of Host infected	No. of Nematodes obtained	Prevalence	Mean intensity	Relative density
October	4	2	12	0.50	6.00	3.00
November	7	7	39	1.00	5.57	5.57
December	3	3	22	1.00	7.33	7.33
January	0	0	0	0.00	0.00	0.00
February	0	0	0	0.00	0.00	0.00
March	8	6	31	0.75	5.16	3.87
April	2	2	12	1.00	6.00	6.00
May	3	3	12	1.00	4.00	4.00
June	3	3	10	1.00	3.33	3.00
July	2	2	10	1.00	5.00	5.00
August	4	3	14	0.75	4.66	3.50
September	4	4	14	1.00	3.50	3.50

Table 17. Average Monthwise Variations in Prevalence, Mean intensity and Relative density of Helminth Parasites of *Hemidactylus flaviviridis* (Male).

Months	No. of Host examined	No. of Host infected	No. of Helminths obtained	Prevalence	Mean intensity	Relative density
October	3	3	21	1.00	7.00	7.00
November	4	4	30	1.00	7.50	7.50
December	2	2	10	1.00	5.00	5.00
January	0	0	0	0.00	0.00	0.00
February	0	0	0	0.00	0.00	0.00
March	5	5	18	1.00	3.60	3.60
April	2	2	8	1.00	4.00	4.00
May	3	2	17	0.66	8.50	5.66
June	4	4	34	1.00	8.50	8.50
July	4	4	33	1.00	8.25	8.25
August	1	1	14	1.00	14.00	14.00
September	2	2	15	1.00	7.50	7.50

Table 18. Average Monthwise Variations in Prevalence, Mean intensity and Relative density of Helminth Parasites of *Hemidactylus flaviviridis* (Female).

Months	No. of Host examined	No. of Host infected	No. of Helminths obtained	Prevalence	Mean intensity	Relative density
October	4	2	20	0.50	10.00	5.00
November	7	7	51	1.00	7.28	7.28
December	3	3	22	1.00	7.33	7.33
January	0	0	0	0.00	0.00	0.00
February	0	0	0	0.00	0.00	0.00
March	8	6	42	0.75	7.00	5.25
April	2	2	12	1.00	6.00	6.00
May	3	3	12	1.00	4.00	4.00
June	3	3	39	1.00	13.00	13.00
July	2	2	18	1.00	9.00	9.00
August	4	3	28	0.75	9.33	7.00
September	4	4	18	1.00	4.50	4.50

Table 19. Seasonal Variations in Prevalence, Mean intensity and Relative density of Cestode Parasites of *Hemidactylus flaviviridis* in relation to the sex of host.

Season	Sex of Host	No. of Host examined	No. of Host infected	No. of cestodes obtained	Prevalence	Mean intensity	Relative density
Winter	Male	9	5	11	0.55	2.20	1.22
Summer	Male	10	3	4	0.30	1.33	0.40
Rainy	Male	11	2	6	0.18	3.00	0.54
Winter	Female	14	2	7	0.14	3.50	0.50
Summer	Female	13	0	0	0.00	0.00	0.00
Rainy	Female	13	4	6	0.30	1.50	0.46

Table 20. Seasonal Variations in Prevalence, Mean intensity and Relative density of Trematode Parasites of *Hemidactylus flaviviridis* in relation to the sex of host.

Season	Sex of Host	No. of Host examined	No. of Host infected	No. of Trematodes obtained	Prevalence	Mean intensity	Relative density
Winter	Male	9	2	7	0.22	3.50	0.77
Summer	Male	10	3	5	0.30	1.66	0.50
Rainy	Male	11	6	22	0.54	3.66	2.00
Winter	Female	14	5	13	0.35	2.60	0.92
Summer	Female	13	3	11	0.23	3.66	0.84
Rainy	Female	13	8	49	0.61	6.12	3.76

Table 21. Seasonal Variations in Prevalence, Mean intensity and Relative density of Nematode Parasites of *Hemidactylus flaviviridis* in relation to the sex of host.

Season	Sex of Host	No. of Host examined	No. of Host infected	No. of Nematodes obtained	Prevalence	Mean intensity	Relative density
Winter	Male	9	9	43	1.00	4.77	4.77
Summer	Male	10	9	34	0.90	3.77	3.40
Rainy	Male	11	11	68	1.00	6.18	6.18
Winter	Female	14	12	73	0.85	6.08	5.21
Summer	Female	13	11	55	0.84	5.00	4.23
Rainy	Female	13	12	48	0.92	4.00	3.69

Table 22. Seasonal Variations in Prevalence, Mean intensity and Relative density of Helminth Parasites of *Hemidactylus flaviviridis* in relation to the sex of host.

Season	Sex of Host	No. of Host examined	No. of Host infected	No. of Helminths obtained	Prevalence	Mean intensity	Relative density
Winter	Male	9	9	61	1.00	6.77	6.77
Summer	Male	10	9	43	0.90	4.77	4.30
Rainy	Male	11	11	96	1.00	8.72	8.72
Winter	Female	14	12	93	0.85	7.75	6.64
Summer	Female	13	11	66	0.84	6.00	5.07
Rainy	Female	13	12	103	0.92	8.58	7.92

Table 23. Annual Variations in Prevalence, Mean intensity and Relative density of Cestode Parasites of *Hemidactylus flaviviridis* in relation to the sex of host.

Sex of Host	No. of Host examined	No. of Host infected	No. of Cestodes obtained	Prevalence	Mean intensity	Relative density
Male	30	10	21	0.33	2.10	0.70
Female	40	6	13	0.15	2.16	0.32

Table 24. Annual Variations in Prevalence, Mean intensity and Relative density of Trematode Parasites of *Hemidactylus flaviviridis* in relation to the sex of host.

Sex of Host	No. of Host examined	No. of Host infected	No. of Trematodes obtained	Prevalence	Mean intensity	Relative density
Male	30	11	34	0.36	3.09	1.13
Female	40	16	73	0.40	4.56	1.82

Table 25. Annual Variations in Prevalence, Mean intensity and Relative density of Nematode Parasites of *Hemidactylus flaviviridis* in relation to the sex of host.

Sex of Host	No. of Host examined	No. of Host infected	No. of Nematodes obtained	Prevalence	Mean intensity	Relative density
Male	30	29	145	0.96	5.00	4.83
Female	40	35	176	0.87	5.02	4.40

Table 26. Annual Variations in Prevalence, Mean intensity and Relative density of Helminth Parasites of *Hemidactylus flaviviridis* in relation to the sex of host.

Sex of Host	No. of Host examined	No. of Host infected	No. of Helminths obtained	Prevalence	Mean intensity	Relative density
Male	30	29	200	0.96	6.89	6.66
Female	40	35	262	0.87	7.48	6.55

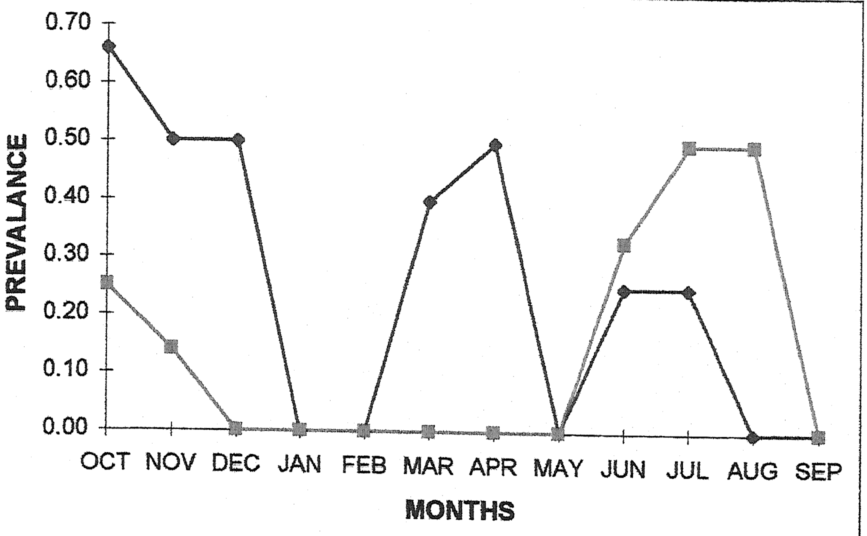


Fig 1: Monthwise variations in prevalence of cestodes in *Hemidactylus flaviviridis*

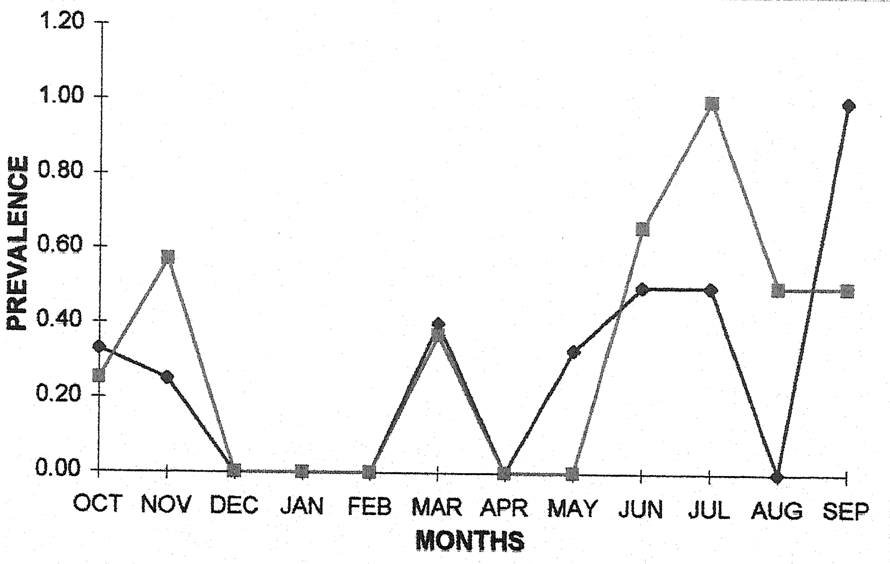


Fig 2: Monthwise variations in prevalence of trematodes in *Hemidactylus flaviviridis*

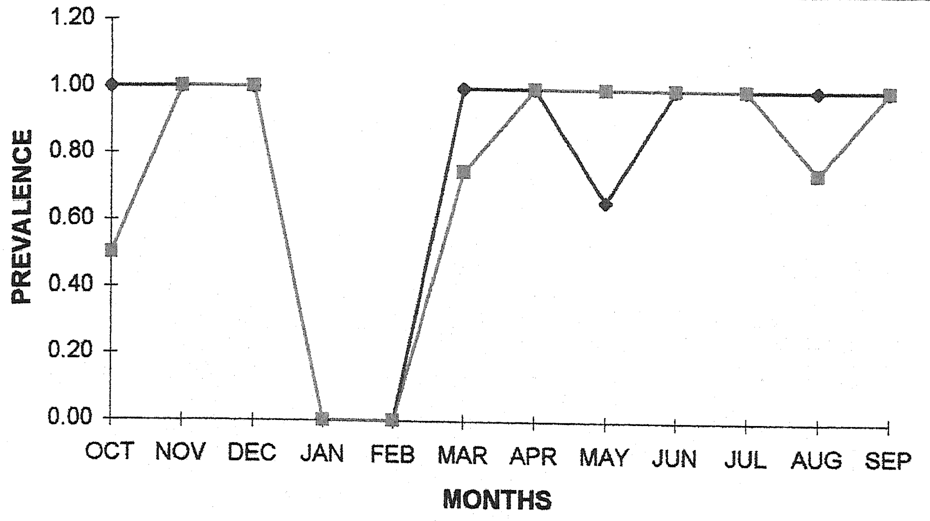


Fig 3: Monthwise variations in prevalence of nematodes in *Hemidactylus flaviviridis*

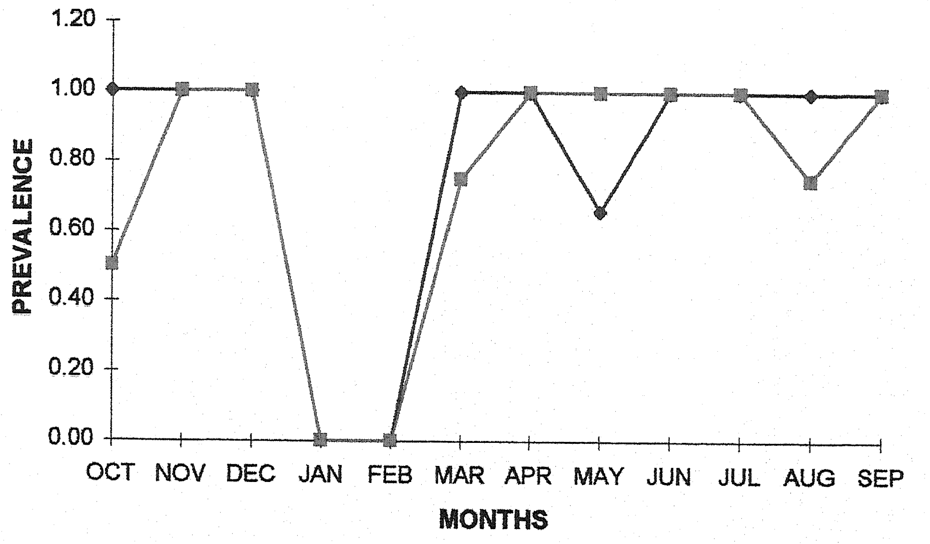


Fig 4: Monthwise variations in prevalence of helminths in *Hemidactylus flaviviridis*

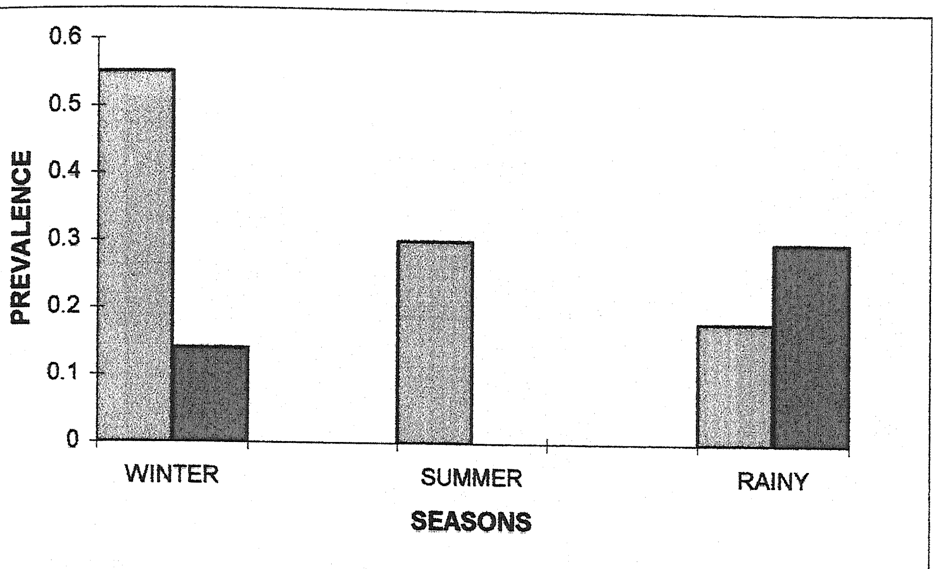


Fig 5:Seasonal variations in prevalence of cestodes in *Hemidactylus flaviviridis*

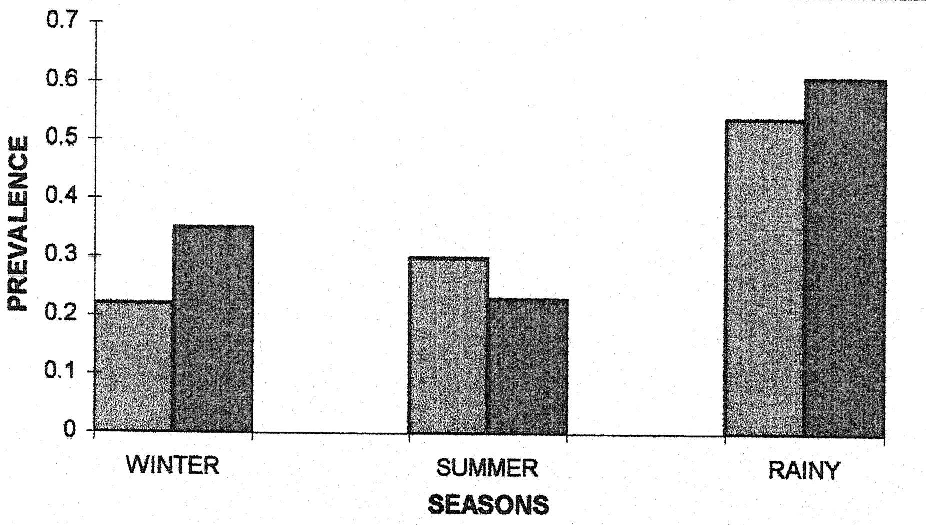


Fig 6:Seasonal variations in prevalence of trematodes in *Hemidactylus flaviviridis*

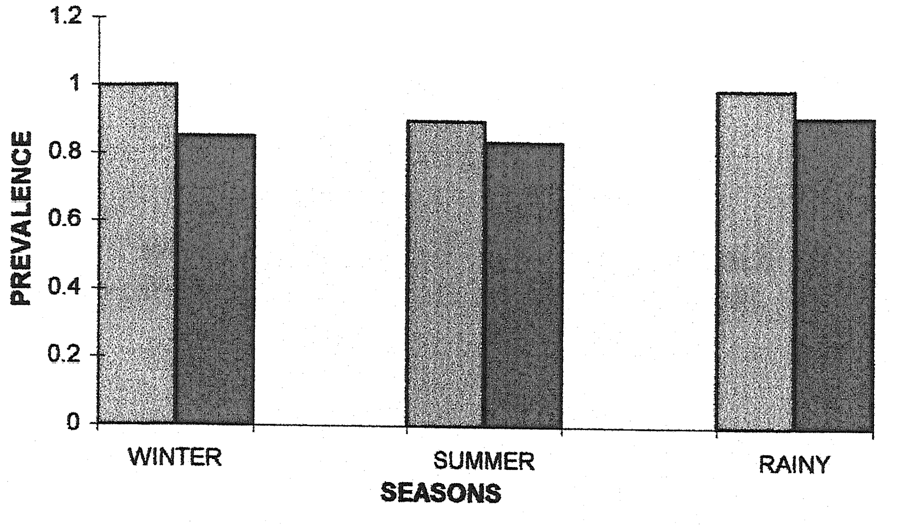


Fig 7: Seasonal variations in prevalence of nematodes in *Hemidactylus flaviviridis*

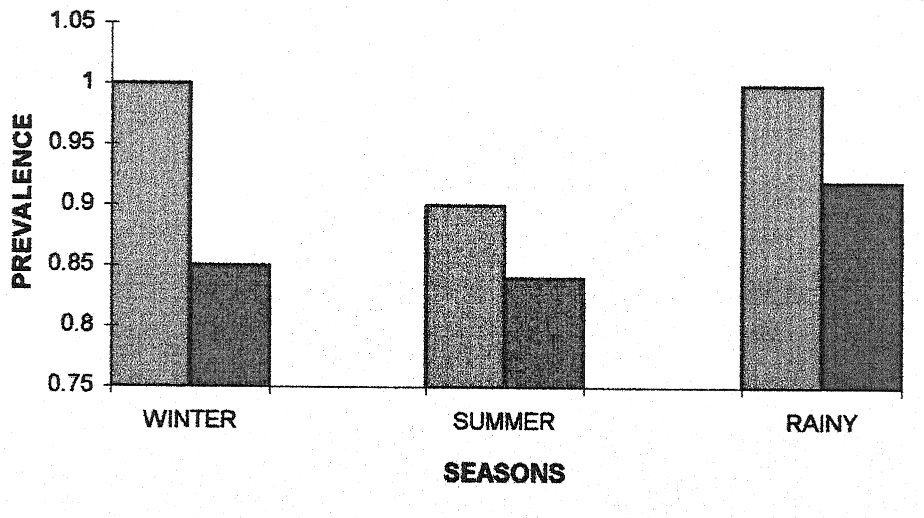


Fig 8: Seasonal variations in prevalence of helminths in *Hemidactylus flaviviridis*

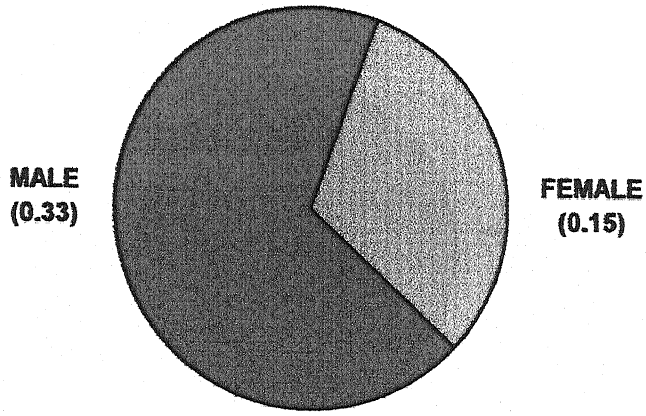


Fig 9: Annual variations in prevalence of cestodes in *Hemidactylus flaviviridis*

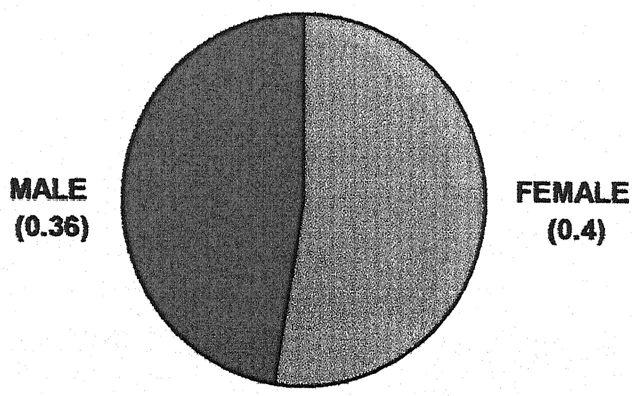


Fig 10: Annual variations in prevalence of trematodes in *Hemidactylus flaviviridis*

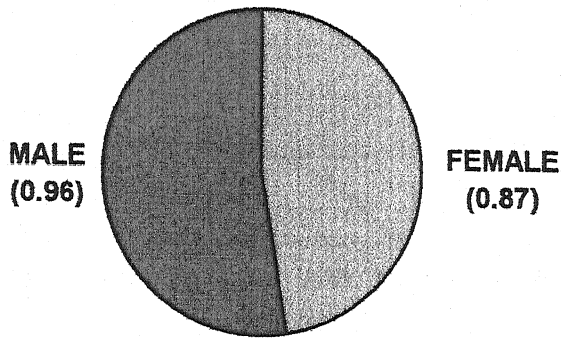


Fig 11: Annual variations in prevalence of nematodes in *Hemidactylus flaviviridis*

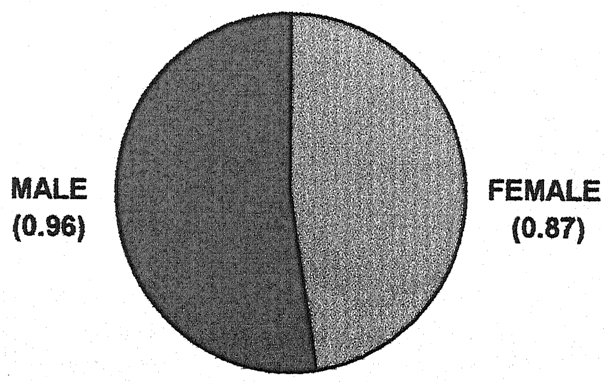


Fig 12: Annual variations in prevalence of helminths in *Hemidactylus flaviviridis*

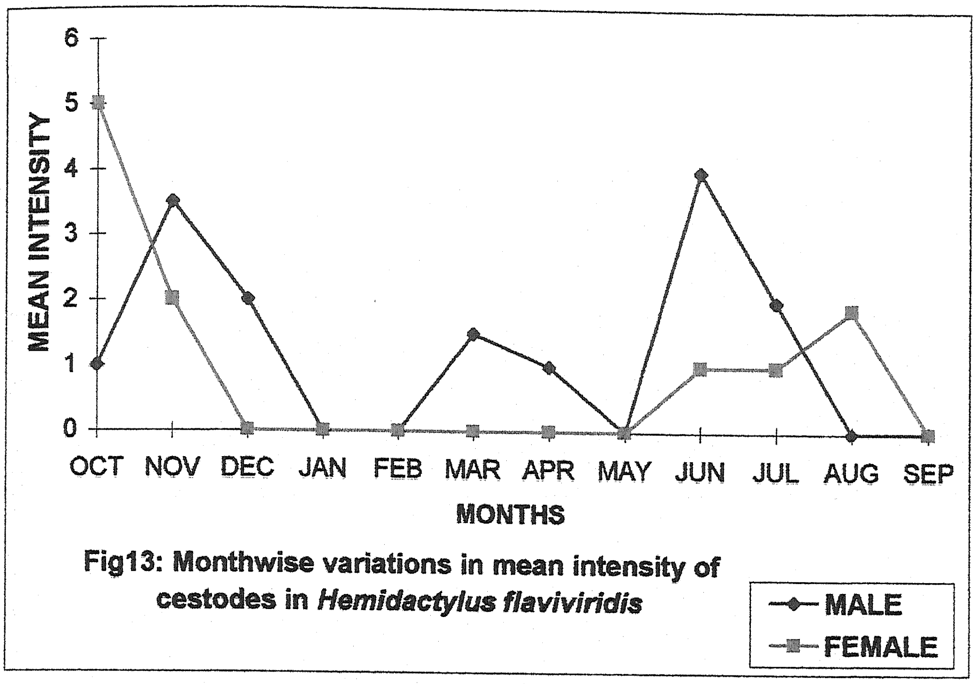


Fig13: Monthwise variations in mean intensity of cestodes in *Hemidactylus flaviviridis*

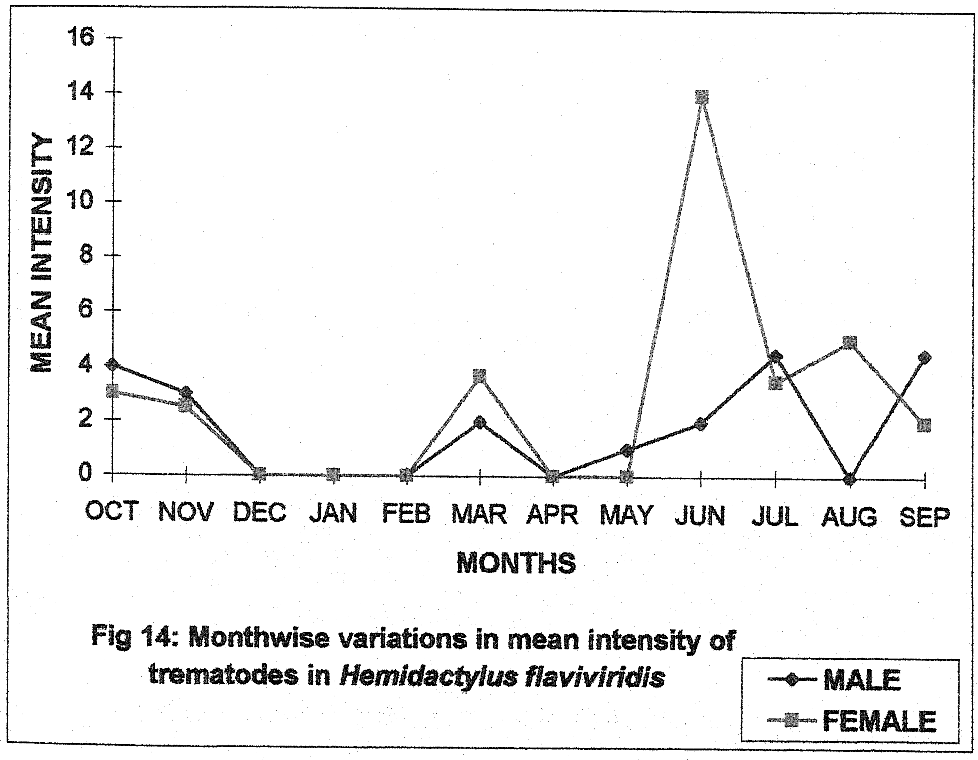


Fig 14: Monthwise variations in mean intensity of trematodes in *Hemidactylus flaviviridis*

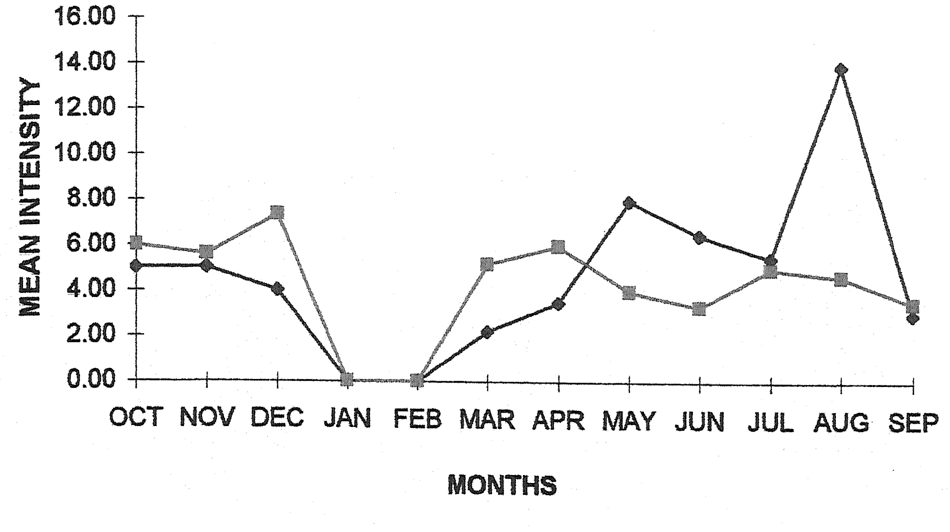


Fig 15: Monthwise variations in mean intensity of nematodes in *Hemidactylus flaviviridis*

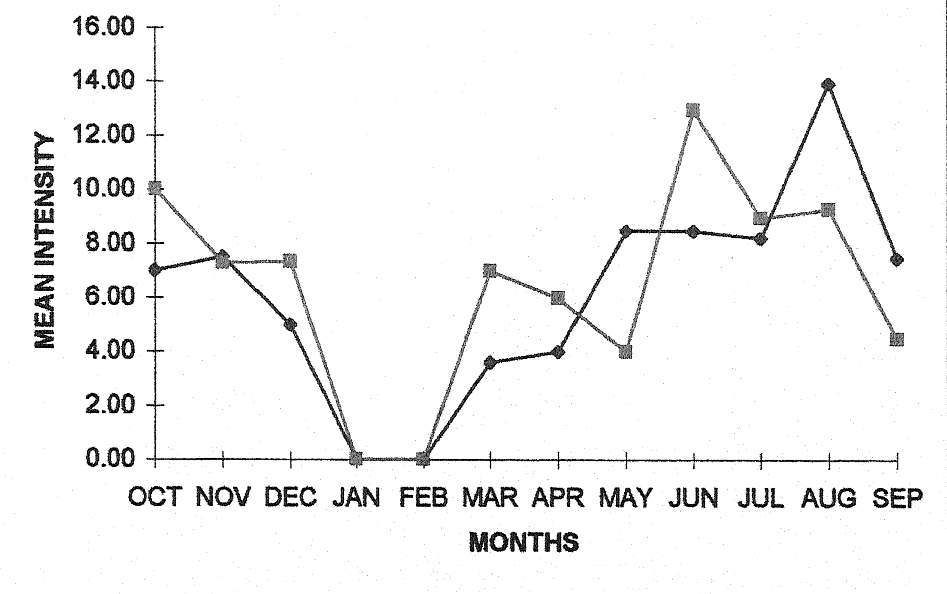


Fig 16: Monthwise variations in mean intensity of helminths in *Hemidactylus flaviviridis*

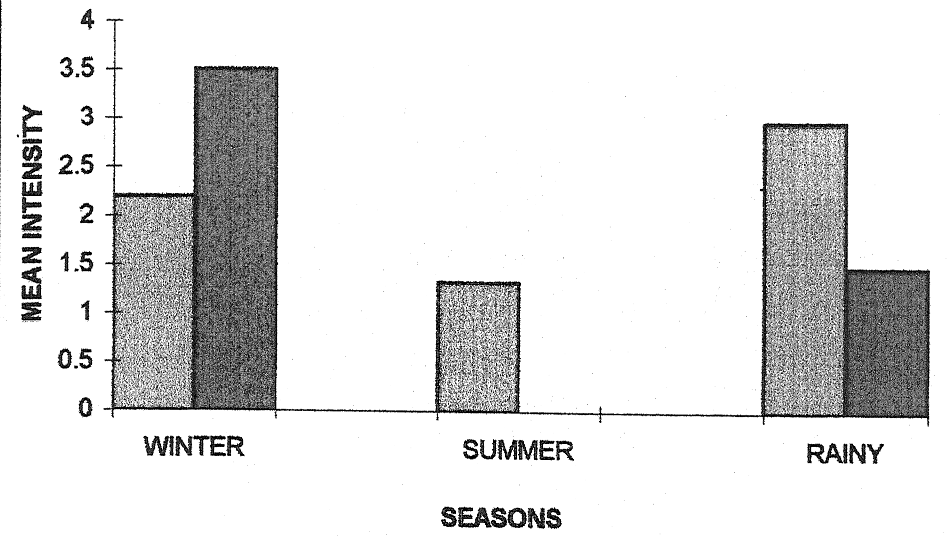


Fig 17: Seasonal variations in mean intensity of cestodes in *Hemidactylus flaviviridis*

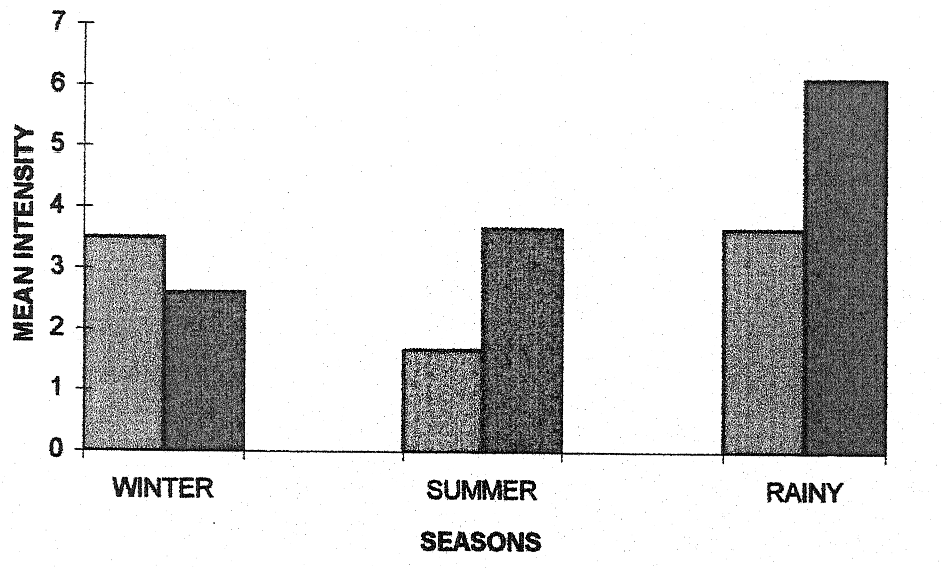


Fig 18: Seasonal variations in mean intensity of trematodes in *Hemidactylus flaviviridis*

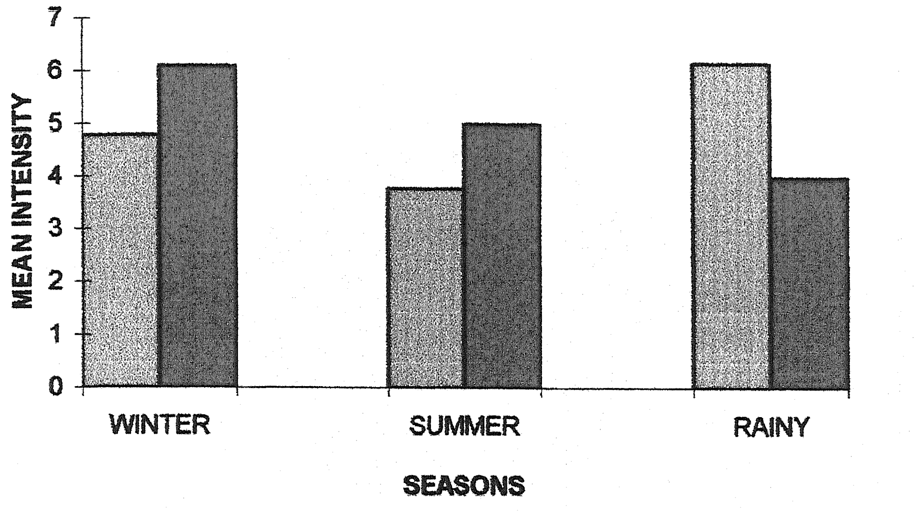


Fig 19: Seasonal variations in mean intensity of nematodes in *Hemidactylus flaviviridis*

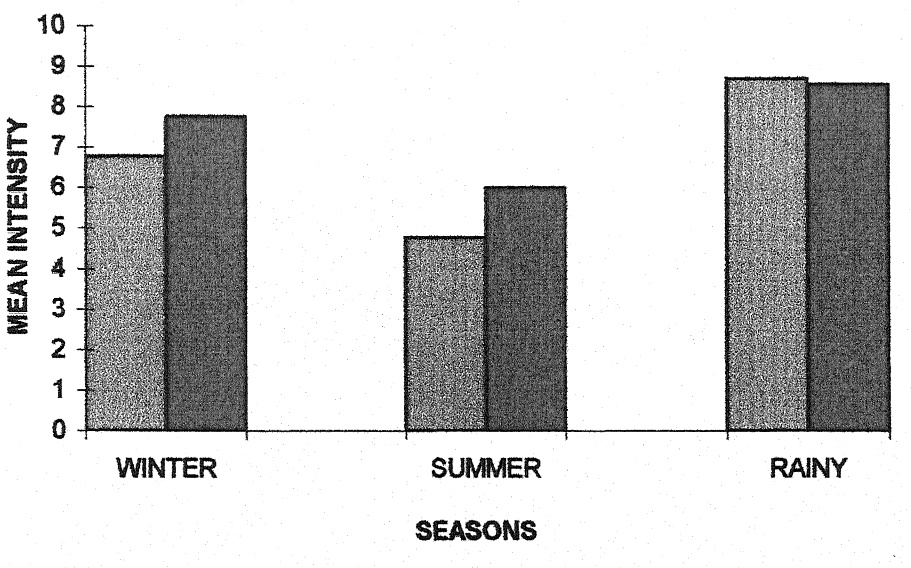


Fig 20: Seasonal variations in mean intensity of helminths in *Hemidactylus flaviviridis*

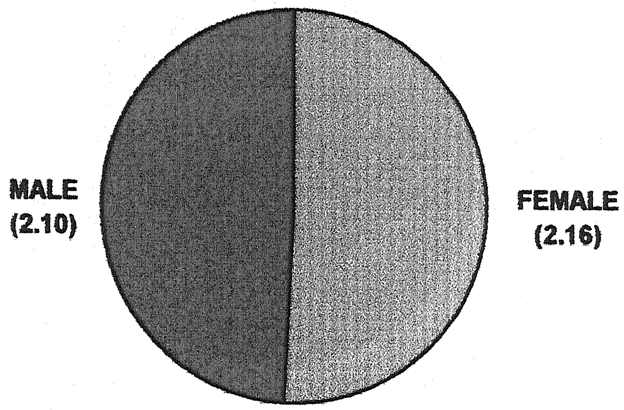


Fig 21: Annual variations in mean intensity of cestodes in *Hemidactylus flaviviridis*

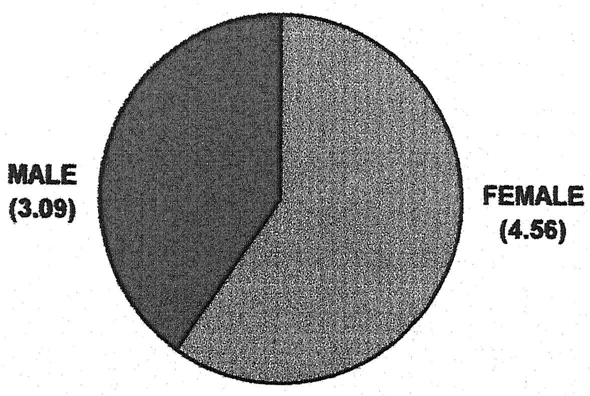


Fig 22: Annual variations in mean intensity of trematodes in *Hemidactylus flaviviridis*

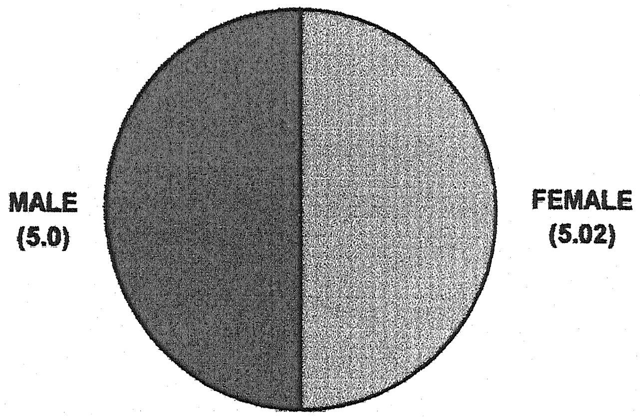


Fig 23: Annual variations in mean intensity of nematodes in *Hemidactylus flaviviridis*

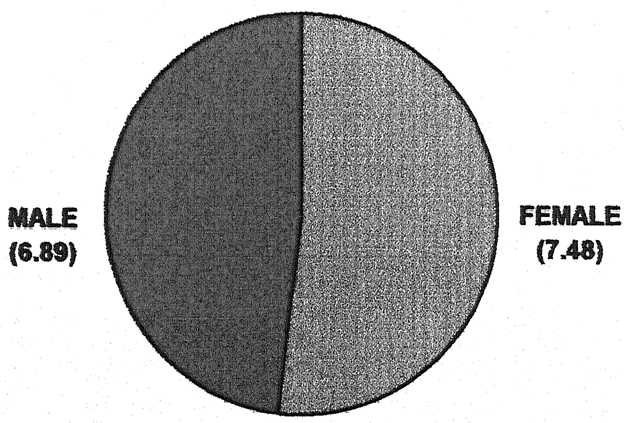


Fig 24: Annual variations in mean intensity of helminths in *Hemidactylus flaviviridis*

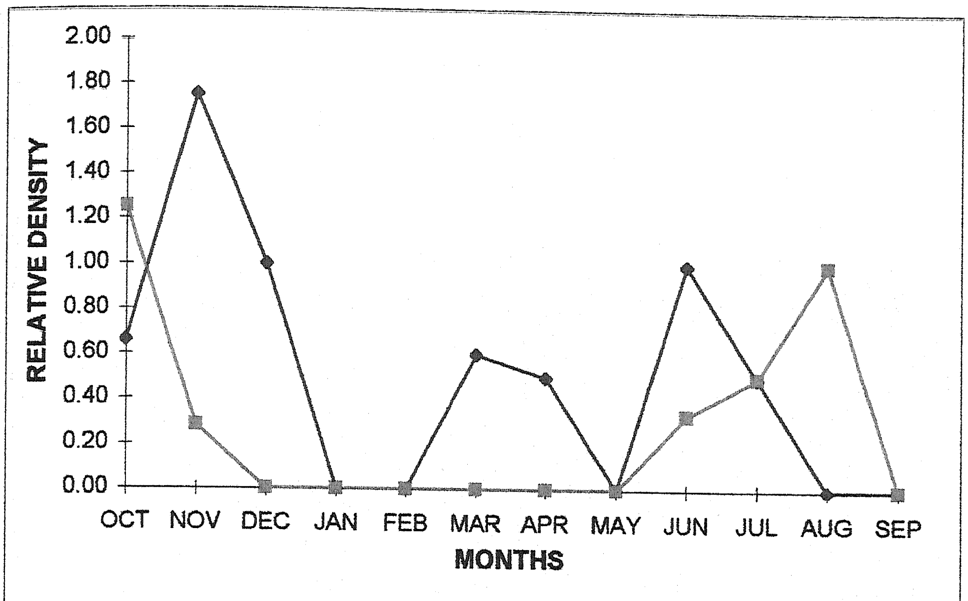


Fig 25 : Monthwise variations in relative density of cestodes in *Hemidactylus flaviviridis*

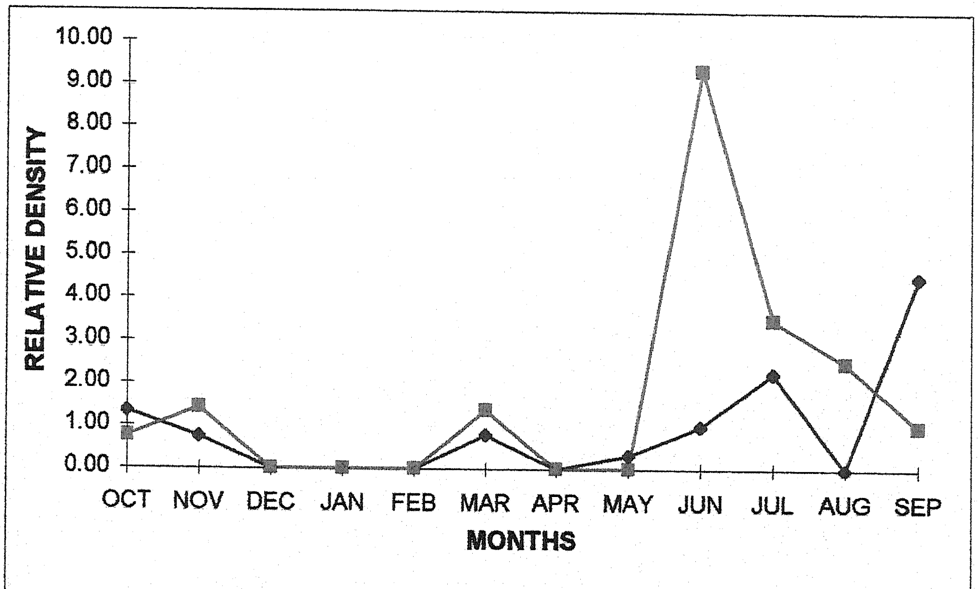


Fig 26: Monthwise variations in relative density of trematodes in *Hemidactylus flaviviridis*

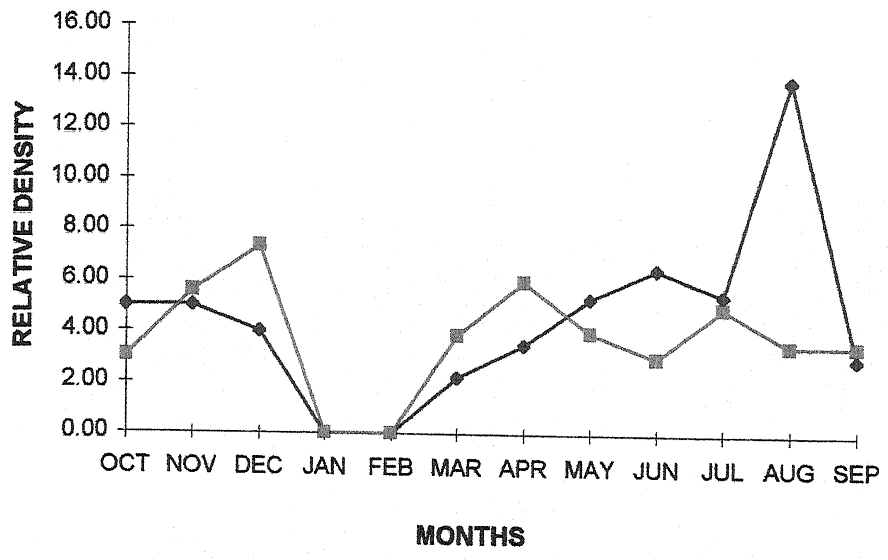
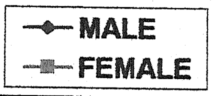


Fig 27: Monthwise variations in relative density of nematodes in *Hemidactylus flaviviridis*



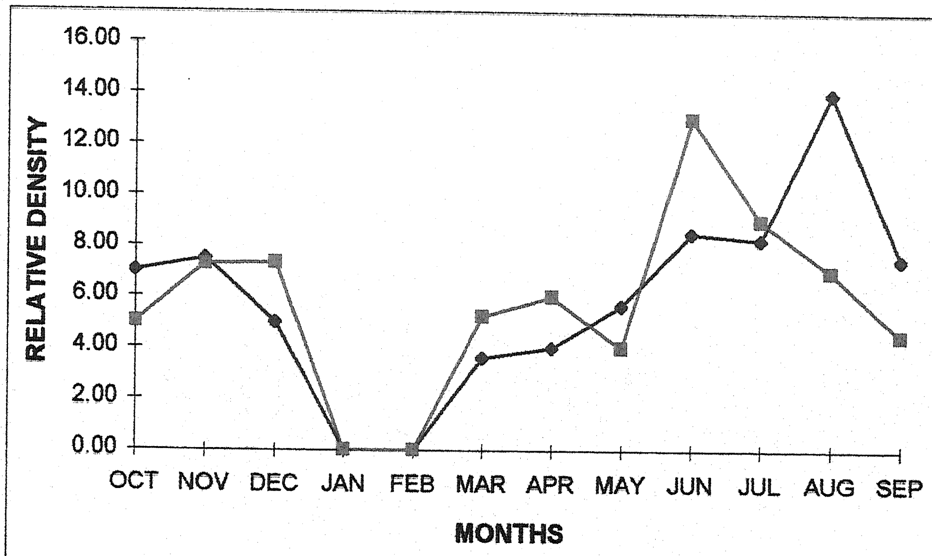
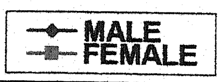


Fig 28: Monthwise variations in relative density of helminths in *Hemidactylus flaviviridis*



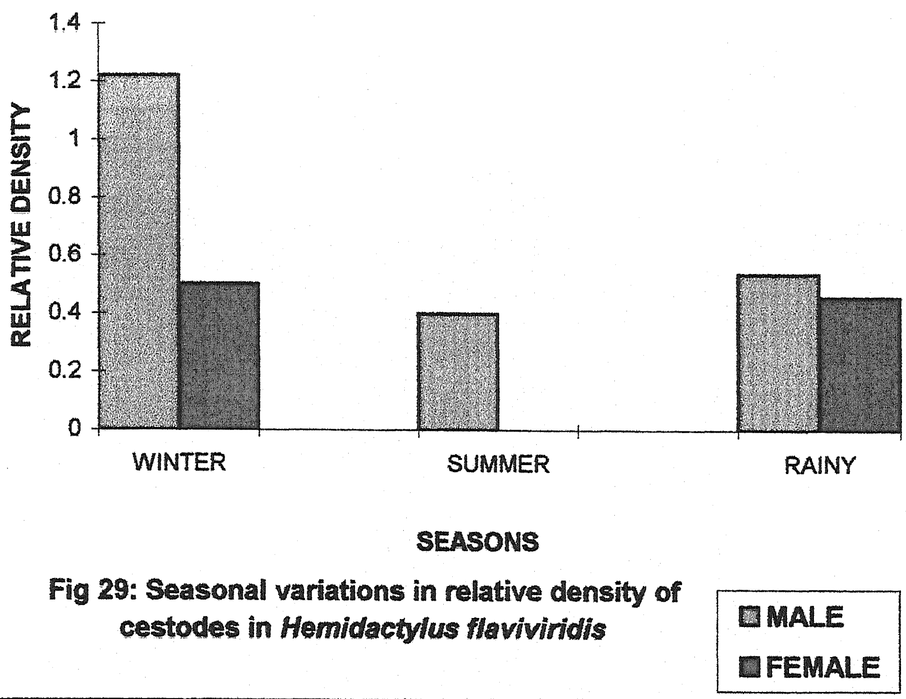


Fig 29: Seasonal variations in relative density of cestodes in *Hemidactylus flaviviridis*

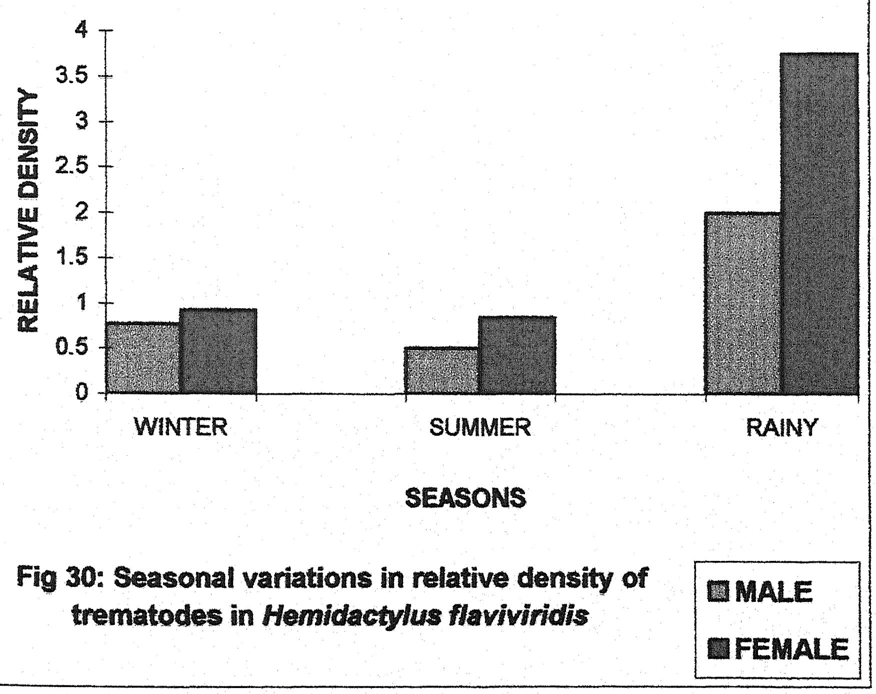


Fig 30: Seasonal variations in relative density of trematodes in *Hemidactylus flaviviridis*

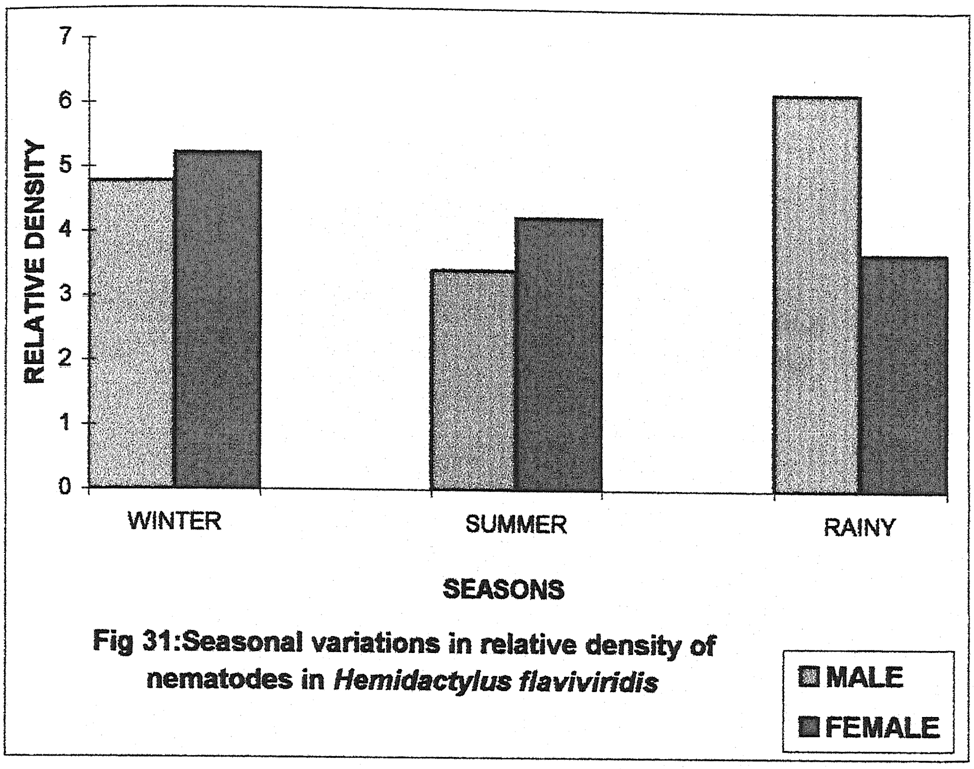


Fig 31:Seasonal variations in relative density of nematodes in *Hemidactylus flaviviridis*

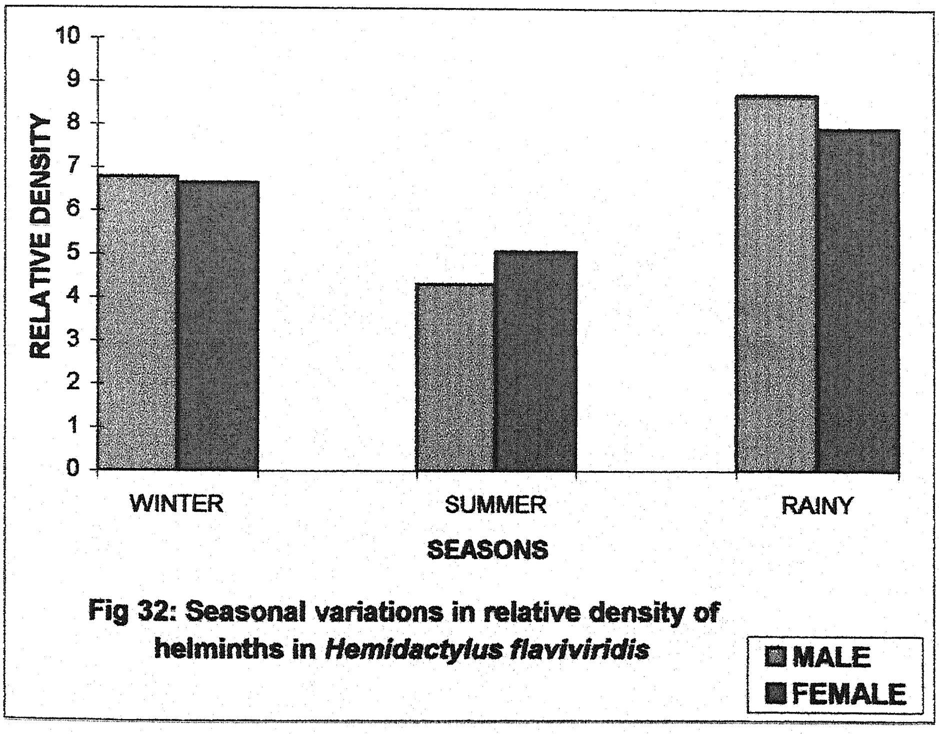


Fig 32: Seasonal variations in relative density of helminths in *Hemidactylus flaviviridis*

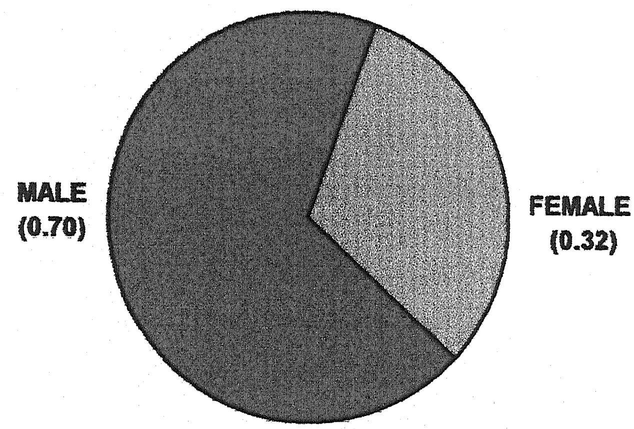


Fig 33: Annual variations in relative density of cestodes in *Hemidactylus flaviviridis*

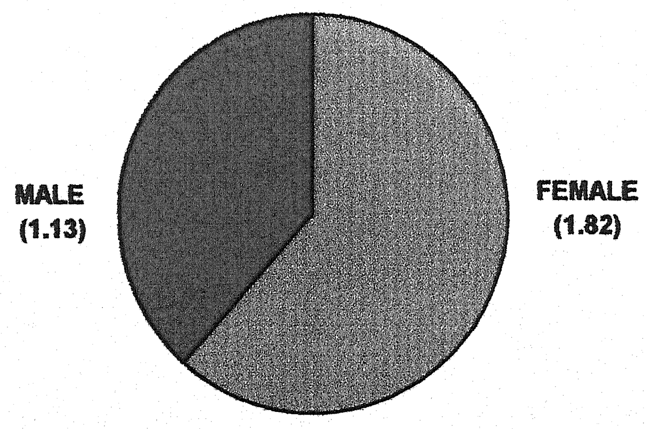


Fig 34: Annual variations in relative density of trematodes in *Hemidactylus flaviviridis*

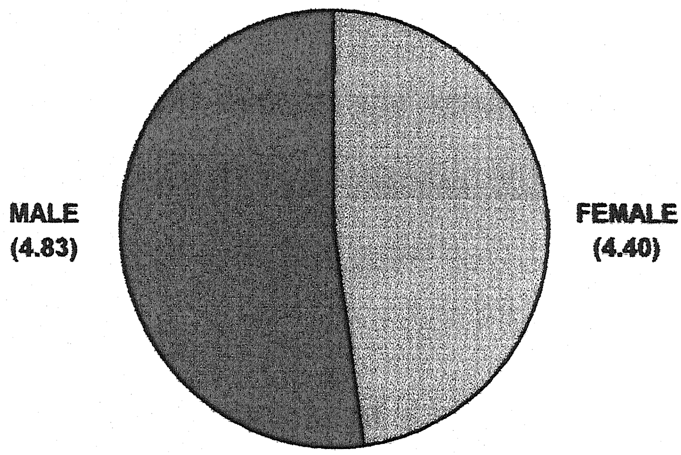


Fig 35: Annual variations in relative density of nematodes in *Hemidactylus flaviviridis*

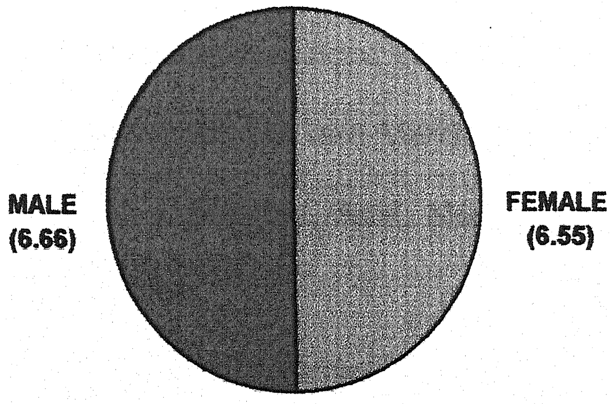


Fig 36: Annual variations in relative density of helminths in *Hemidactylus flaviviridis*

Domestic Fowl, *Gallus gallus* (Linnaeus)

In the present studies of *Gallus gallus* (Linnaeus), a total number of 69 hosts were examined and 5822 helminth parasites were obtained from the gall bladder and intestine of the hosts. They include 1630 cestodes, 1161 trematodes, 3031 nematodes and no acanthocephala.

PREVALENCE

Average monthwise variations of :

Cestode : Table – 27, 28. Figure – 37.

The monthwise prevalence in male fowls is zero in May, moderate in March, April and June and high in October, November, December, January, February, July, August, and September.

The monthwise prevalence in female fowls is moderate in January, February and March and high in October, November, December, April, May, June, July, August and September.

Trematode : Table – 29, 30. Figure – 38.

The monthwise prevalence in male fowls is zero in all the months of the year but it is high in December.

The monthwise prevalence in female fowls is zero in all the months of the year but it is moderate in October and September.

Nematode : Table – 31, 32. Figure – 39.

The monthwise prevalence in male fowls is moderate in July and high in October, November, December, January, February, March, May, June, August and September.

The monthwise prevalence in female fowls is moderate in January and February and high in October, November, December, March, April, May, June, July, August and September.

Acanthocephala :

The monthwise prevalence is zero in both the male and female fowls in all the months of the year from October to September.

Helminth : Table – 33, 34. Figure – 40.

The monthwise prevalence in male fowls is high in all the months of the year from October to September.

The monthwise prevalence in female fowls is moderate in January and February but high in October,

November, December, March, April, May, June, July, August and September.

Average seasonal variations of :

Cestode : Table – 35. Figure – 41.

The seasonal prevalence in male fowls is moderate in summer season and it is high winter and rainy seasons of the year.

The seasonal prevalence in female fowls is high in winter, summer and rainy seasons of the year.

Trematode : Table – 36. Figure – 42.

The seasonal prevalence in male fowls is zero in summer and rainy seasons and it is low in winter season of the year.

The seasonal prevalence in female fowls is zero in summer season and low in winter and rainy seasons of the year.

Nematode : Table – 37. Figure – 43.

The seasonal prevalence in male fowls is high in winter, summer and rainy seasons of the year.

The seasonal prevalence in female fowls is also high in winter, summer and rainy seasons of the year.

Acanthocephala :

The seasonal prevalence is zero in both the male and female fowls in all the seasons of the year.

Helminth : Table – 38. Figure – 44.

The seasonal prevalence in male and female fowls is high in winter, summer and rainy seasons of the year.

Average annual variations of :

Cestode : Table – 39. Figure – 45.

The annual prevalence is high in both the male and female fowls. The prevalence is higher in females than the males.

Trematode : Table – 40. Figure – 46.

The annual prevalence is low and almost equal in both the male and female fowls.

Nematode : Table – 41. Figure – 47.

The annual prevalence is high and almost equal in both the male and female fowls.

Acanthocephala :

The annual prevalence is zero in both the male and female fowls.

Helminth : Table – 42. Figure – 48.

The annual prevalence is high in both the male and female fowls. The prevalence is slightly higher in males than the females.

MEAN INTENSITY

Average monthwise variations of :

Cestode : Table – 27, 28. Figure – 49.

The monthwise mean intensity in male fowls is zero in May, low in October, November, January, March, April, June, August and September, moderate in July and high in December and February.

The monthwise mean intensity in female fowls is low in all the months of the year from October to September.

Trematode : Table – 29, 30. Figure – 50.

The monthwise mean intensity in male fowls is zero in all the months of the year except December where it is high.

The monthwise mean intensity in female fowls is also zero mostly in all the months of the year but it is high in October and September.

Nematode : Table – 31, 32. Figure – 51.

The monthwise mean intensity in male fowls is low in December, January, February, March, April, June and July, moderate in October, August and September and high in November and May.

The monthwise mean intensity in female fowls is low in February, March, April, June, July, August and September and high in October, November, December, January and May.

Acanthocephala :

The monthwise mean intensity is zero in both the male and female fowls in all the months of the year from October to September.

Helminth : Table – 33, 34. Figure – 52.

The monthwise mean intensity in male fowls is low in January, March, April and June, moderate in October, July, August and September and high in November, December, February and May.

The monthwise mean intensity in female fowls is low in February, March, June and July, moderate in April, August and September and high in October, November, December, January and May.

Average seasonal variations of :

Cestode : Table – 35. Figure – 53.

The seasonal mean intensity in male fowls is low in rainy seasons, moderate in winter season and high in summer season of the year.

The seasonal mean intensity in female fowls is low in winter, summer and rainy seasons of the year.

Trematode : Table – 36. Figure – 54.

The seasonal mean intensity in male fowls is zero in summer and rainy seasons and high in the winter season of the year.

The seasonal mean intensity in female fowls is zero in summer season and high in winter and rainy seasons of the year.

Nematode : Table – 37. Figure – 55.

The seasonal mean intensity in male fowls is low in rainy season and moderate in winter and summer seasons of the year.

The seasonal mean intensity in female fowls is low in rainy season, moderate in summer season and high in winter season of the year.

Acanthocephala :

The seasonal mean intensity is zero in both the male and female fowls in all the seasons of the year.

Helminth : Table – 38. Figure –56.

The seasonal mean intensity in male fowls is moderate in rainy season and high in winter and summer seasons of the year.

The seasonal mean intensity in female fowls is moderate in summer and rainy seasons and high in winter season of the year.

Average annual variations of :

Cestode : Table – 39. Figure – 57.

The annual mean intensity is low in female fowls and moderate in male fowls. The mean intensity is higher in males than the females.

Trematode : Table – 40. Figure – 58.

The annual mean intensity is high in both the male and female fowls. The mean intensity is higher in females than the males.

Nematode : Table – 41. Figure – 59.

The annual mean intensity is moderate in both the male and female fowls. The mean intensity is higher in females than the males.

Acanthocephala :

The annual mean intensity is zero in both the male and female fowls.

Helminth : Table – 42. Figure – 60.

The annual mean intensity is high in both the male and female fowls. The mean intensity is higher in females than the males.

RELATIVE DENSITY

Average monthwise variations of :

Cestode : Table – 27, 28. Figure – 61.

The monthwise relative density in male fowls is zero in May, low in October, November, January, March, April, June, August and September, moderate in July and high in December and February.

The monthwise relative density in female fowls is low in all the months of the year from October to September.

Trematode : Table – 29, 30. Figure – 62.

The monthwise relative density in male fowls is mostly zero in all the months of the year but it is high in December.

The monthwise relative density in female fowls is zero in November, December, January, February, March, April, May, June, July and August, moderate in September and high in October.

Nematode : Table – 31, 32. Figure – 63.

The monthwise relative density in male fowls is low in December, January, February, March, April, June and July, moderate in October, August and September and high in November and May.

The monthwise relative density in female fowls is low in February, March, April, June, July, August and September and high in October, November, December, January and May.

Acanthocephala :

The monthwise relative density is zero in both the male and female fowls in all the months of the year from October to September.

Helminth : Table – 33, 34. Figure – 64.

The monthwise relative density in male fowls is low in January, March, April, and June, moderate in October, July, August and September and high in November, December, February and May.

The monthwise relative density in female fowls is low in February, March, June and July, moderate in April, August and September and high in October, November, December, January and May.

Average seasonal variations of :

Cestode : Table – 35. Figure – 65.

The seasonal relative density in male fowls is low in rainy season and moderate in winter and summer seasons of the year.

The seasonal relative density in female fowls is low in winter, summer and rainy seasons of the year.

Trematode : Table – 36. Figure – 66.

The seasonal relative density in male fowls is zero in summer and rainy seasons and moderate in winter season of the year.

The seasonal relative density in female fowls is zero in summer season, low in rainy season and moderate in the winter season of the year.

Nematode : Table – 37. Figure – 67.

The seasonal relative density in male fowls is low in rainy seasons and moderate in winter and summer seasons of the year.

The seasonal relative density in female fowls is low in rainy season, moderate in summer season and high in winter season of the year.

Acanthocephala :

The seasonal relative density is zero in both the male and female fowls in all the seasons of the year.

Helminth : Table – 38. Figure – 68.

The seasonal relative density in male fowls is moderate in rainy season and high in winter and summer seasons of the year.

The seasonal relative density in female fowls is moderate in summer and rainy seasons and high in winter season of the year.

Average annual variations of :

Cestode : Table – 39. Figure – 69.

The annual relative density is low in female fowls and moderate in male fowls. It is higher in males than the females.

Trematode : Table – 40. Figure – 70.

The annual relative density is low in both the male and female fowls. It is higher in females than the males.

Nematode : Table – 41. Figure – 71.

The annual relative density is moderate in both the male and female fowls. It is higher in females than the males.

Acanthocephala :

The annual relative density is zero in both the male and female fowls.

Helminth : Table – 42. Figure – 72.

The annual relative density is high in both the male and female fowls. It is higher in males than the females.

Table 27. Average Monthwise Variations in Prevalence, Mean intensity and Relative density of Cestode Parasites of *Gallus gallus* (Male).

Months	No. of Host examined	No. of Host Infected	No. of Cestodes obtained	Prevalence	Mean intensity	Relative density
October	7	5	51	0.71	10.20	7.28
November	2	2	36	1.00	18.00	18.00
December	3	3	630	1.00	210.00	210.00
January	2	2	23	1.00	11.50	11.50
February	2	2	363	1.00	181.50	181.50
March	3	2	17	0.66	8.50	5.66
April	2	1	3	0.50	3.00	1.50
May	3	0	0	0.00	0.00	0.00
June	3	2	19	0.66	9.50	6.33
July	3	3	97	1.00	32.33	32.33
August	2	2	13	1.00	6.50	6.50
September	3	3	49	1.00	16.33	16.33

Table 28. Average Monthwise Variations in Prevalence, Mean intensity and Relative density of Cestode Parasites of *Gallus gallus* (Female).

Months	No. of Host examined	No. of Host infected	No. of Cestodes obtained	Prevalence	Mean intensity	Relative density
October	4	4	54	1.00	13.50	13.50
November	2	2	46	1.00	23.00	23.00
December	3	3	30	1.00	10.00	10.00
January	2	1	5	0.50	5.00	2.50
February	3	1	2	0.33	2.00	0.66
March	2	1	6	0.50	6.00	3.00
April	3	3	72	1.00	24.00	24.00
May	3	3	14	1.00	4.66	4.66
June	3	3	7	1.00	2.33	2.33
July	3	3	27	1.00	9.00	9.00
August	3	3	47	1.00	15.66	15.66
September	3	3	19	1.00	6.33	6.33

Table 29. Average Monthwise Variations in Prevalence, Mean intensity and Relative density of Trematode Parasites of *Gallus gallus* (Male).

Months	No. of Host examined	No. of Host infected	No. of Trematodes obtained	Prevalence	Mean intensity	Relative density
October	7	0	0	0.00	0.0	0.00
November	2	0	0	0.00	0.0	0.00
December	3	3	435	1.00	145.0	145.00
January	2	0	0	0.00	0.0	0.00
February	2	0	0	0.00	0.0	0.00
March	3	2	0	0.00	0.0	0.00
April	2	0	0	0.00	0.0	0.00
May	3	1	0	0.00	0.0	0.00
June	3	2	0	0.00	0.0	0.00
July	3	2	0	0.00	0.0	0.00
August	2	0	0	0.00	0.0	0.00
September	3	2	0	0.00	0.0	0.00

Table 30. Average Monthwise Variations in Prevalence, Mean intensity and Relative density of Trematode Parasites of *Gallus gallus* (Female).

Months	No. of Host examined	No. of Host infected	No. of Trematodes obtained	Prevalence	Mean intensity	Relative density
October	4	2	640	0.50	320.00	160.00
November	2	0	0	0.00	0.00	0.00
December	3	0	0	0.00	0.00	0.00
January	2	0	0	0.00	0.00	0.00
February	3	0	0	0.00	0.00	0.00
March	2	0	0	0.00	0.00	0.00
April	3	0	0	0.00	0.00	0.00
May	3	0	0	0.00	0.00	0.00
June	3	0	0	0.00	0.00	0.00
July	3	0	0	0.00	0.00	0.00
August	3	0	0	0.00	0.00	0.00
September	3	1	86	0.33	86.00	28.66

Table 31. Average Monthwise Variations in Prevalence, Mean intensity and Relative density of Nematode Parasites of *Gallus gallus* (Male).

Months	No. of Host examined	No. of Host infected	No. of Nematodes obtained	Prevalence	Mean intensity	Relative density
October	7	6	330	0.85	55.00	47.14
November	2	2	284	1.00	142.00	142.00
December	3	3	12	1.00	4.00	4.00
January	2	2	8	1.00	4.00	4.00
February	2	2	16	1.00	8.00	8.00
March	3	3	34	1.00	11.33	11.33
April	2	2	8	1.00	4.00	4.00
May	3	3	366	1.00	122.00	122.00
June	3	3	26	1.00	8.66	8.66
July	3	2	28	0.66	14.00	9.33
August	2	2	60	1.00	30.00	30.00
September	3	3	102	1.00	34.00	34.00

Table 32. Average Monthwise Variations in Prevalence, Mean intensity and Relative density of Nematode Parasites of *Gallus gallus* (Female).

Months	No. of Host examined	No. of Host infected	No. of Nematodes obtained	Prevalence	Mean intensity	Relative density
October	4	4	516	1.00	129.00	129.00
November	2	2	206	1.00	103.00	103.00
December	3	3	202	1.00	67.33	67.33
January	2	1	274	0.50	274.00	137.00
February	3	1	18	0.33	18.00	6.00
March	2	2	21	1.00	10.50	10.50
April	3	3	33	1.00	11.00	11.00
May	3	3	338	1.00	112.66	112.66
June	3	3	14	1.00	4.66	4.66
July	3	3	50	1.00	16.66	16.66
August	3	3	41	1.00	13.66	13.66
September	3	3	44	1.00	14.66	14.66

Table 33. Average Monthwise Variations in Prevalence, Mean intensity and Relative density of Helminth Parasites of *Gallus gallus* (Male).

Months	No. of Host examined	No. of Host infected	No. of Helminths obtained	Prevalence	Mean intensity	Relative density
October	7	6	381	0.85	63.50	54.42
November	2	2	320	1.00	160.00	160.00
December	3	3	1077	1.00	359.00	359.00
January	2	2	31	1.00	15.50	15.50
February	2	2	379	1.00	189.50	189.50
March	3	3	51	1.00	17.00	17.00
April	2	2	11	1.00	5.50	5.50
May	3	3	366	1.00	122.00	122.00
June	3	3	45	1.00	15.00	15.00
July	3	3	125	1.00	41.66	41.66
August	2	2	73	1.00	36.50	36.50
September	3	3	151	1.00	50.33	50.33

Table 34. Average Monthwise Variations in Prevalence, Mean intensity and Relative density of Helminth Parasites of *Gallus gallus* (Female).

Months	No. of Host examined	No. of Host infected	No. of Helminths obtained	Prevalence	Mean intensity	Relative density
October	4	4	1210	1.00	302.50	302.50
November	2	2	252	1.00	126.00	126.00
December	3	3	232	1.00	77.33	77.33
January	2	1	279	0.50	279.00	139.50
February	3	1	20	0.33	20.00	6.66
March	2	2	27	1.00	13.50	13.50
April	3	3	105	1.00	35.00	35.00
May	3	3	352	1.00	117.33	117.33
June	3	3	21	1.00	7.00	7.00
July	3	3	77	1.00	25.66	25.66
August	3	3	88	1.00	29.33	29.33
September	3	3	149	1.00	49.66	49.66

Table 35. Seasonal Variations in Prevalence, Mean intensity and Relative density of Cestode Parasites of *Gallus gallus* in relation to the sex of host.

Season	Sex of Host	No. of Host examined	No. of Host infected	No. of Cestodes obtained	Prevalence	Mean intensity	Relative density
Winter	Male	14	12	740	0.85	61.66	52.85
Summer	Male	10	5	383	0.50	76.60	38.30
Rainy	Male	11	10	178	0.90	17.80	16.18
Winter	Female	11	10	135	0.90	13.50	12.27
Summer	Female	11	8	94	0.72	11.75	8.54
Rainy	Female	12	12	100	1.00	8.33	8.33

Table 36. Seasonal Variations in Prevalence, Mean intensity and Relative density of Trematode Parasites of *Gallus gallus* in relation to the sex of host.

Season	Sex of Host	No. of Host examined	No. of Host infected	No. of Trematodes obtained	Prevalence	Mean intensity	Relative density
Winter	Male	14	3	435	0.21	145.00	31.07
Summer	Male	10	0	0	0.00	0.00	0.00
Rainy	Male	11	0	0	0.00	0.00	0.00
Winter	Female	11	2	640	0.18	320.00	58.18
Summer	Female	11	0	0	0.00	0.00	0.00
Rainy	Female	12	1	86	0.08	86.00	7.16

Table 37. Seasonal Variations in Prevalence, Mean intensity and Relative density of Nematode Parasites of *Gallus gallus* in relation to the sex of host.

Season	Sex of Host	No. of Host examined	No. of Host infected	No. of Nematodes obtained	Prevalence	Mean intensity	Relative density
Winter	Male	14	13	634	0.92	48.76	45.28
Summer	Male	10	10	424	1.00	42.40	42.40
Rainy	Male	11	10	216	0.90	21.60	19.63
Winter	Female	11	10	1198	0.90	119.80	108.90
Summer	Female	11	9	410	0.81	45.50	37.27
Rainy	Female	12	12	149	1.00	12.41	12.41

Table 38. Seasonal Variations in Prevalence, Mean intensity and Relative density of Helminth Parasites of *Gallus gallus* in relation to the sex of host.

Season	Sex of Host	No. of Host examined	No. of Host infected	No. of Helminths obtained	Prevalence	Mean intensity	Relative density
Winter	Male	11	7	112	0.63	16.00	10.10
Summer	Male	13	8	62	0.61	7.75	4.70
Rainy	Male	5	4	310	0.80	77.50	62.00
Winter	Female	9	9	406	1.00	45.10	45.10
Summer	Female	7	3	81	0.42	27.00	11.50
Rainy	Female	12	9	467	0.75	51.80	38.90

Table 39. Annual Variations in Prevalence, Mean intensity and Relative density of Cestode Parasites of *Gallus gallus* in relation to the sex of host.

Sex of Host	No. of Host examined	No. of Host infected	No. of Cestodes obtained	Prevalence	Mean intensity	Relative density
Male	35	27	1301	0.77	48.18	37.17
Female	34	30	329	0.88	10.96	9.67

Table 40. Annual Variations in Prevalence, Mean intensity and Relative density of Trematode Parasites of *Gallus gallus* in relation to the sex of host.

Sex of Host	No. of Host examined	No. of Host infected	No. of Trematodes obtained	Prevalence	Mean intensity	Relative density
Male	35	3	435	0.08	145.00	12.72
Female	34	3	726	0.08	242.00	21.35

Table 41. Annual Variations in Prevalence, Mean intensity and Relative density of Nematode Parasites of *Gallus gallus* in relation to the sex of host.

Sex of Host	No. of Host examined	No. of Host infected	No. of Nematodes obtained	Prevalence	Mean intensity	Relative density
Male	35	33	1274	0.94	38.60	36.40
Female	34	31	1757	0.91	56.67	51.67

Table 42. Annual Variations in Prevalence, Mean intensity and Relative density of Helminth Parasites of *Gallus gallus* in relation to the sex of host.

Sex of Host	No. of Host examined	No. of Host infected	No. of Helminths obtained	Prevalence	Mean intensity	Relative density
Male	35	34	3010	0.97	88.52	86.00
Female	34	31	2812	0.91	90.70	82.70

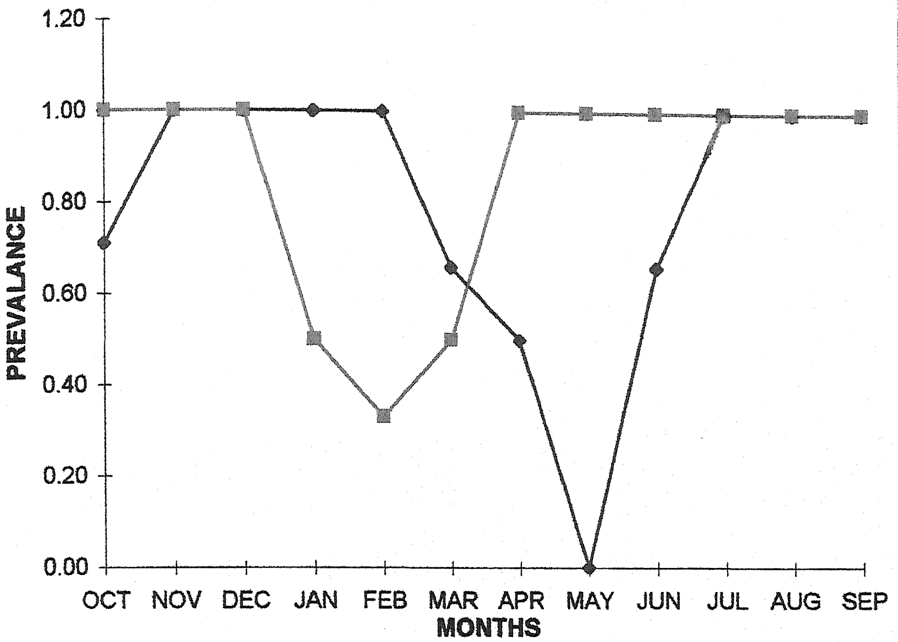


Fig 37:Monthwise variations in prevalence of cestodes in *Gallus gallus*

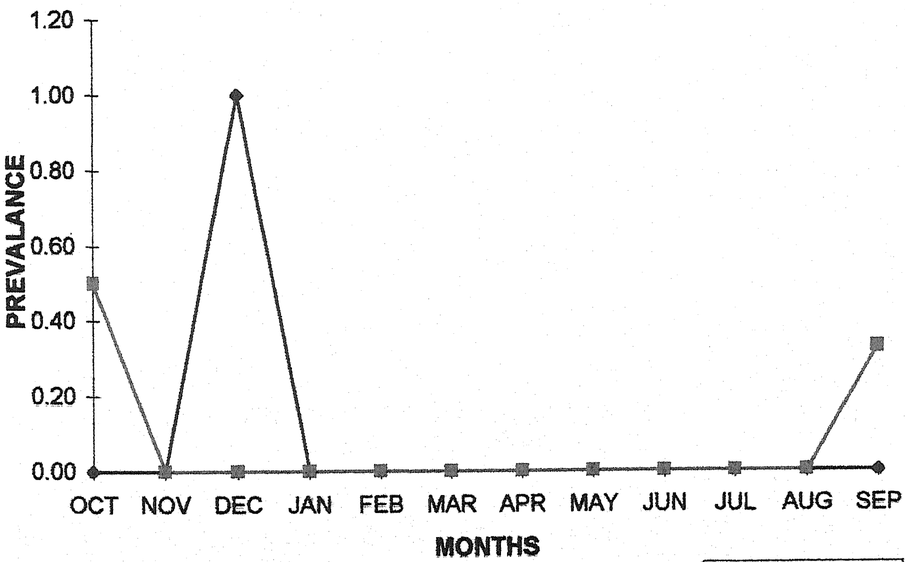


Fig 38: Monthwise variations in prevalence of trematodes in *Gallus gallus*

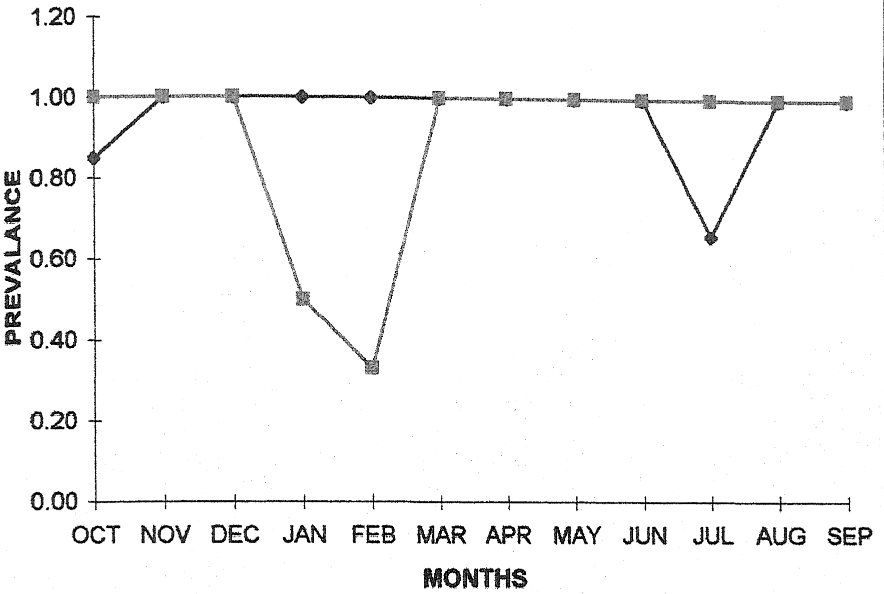


Fig 39: Monthwise variations in prevalence of nematodes in *Gallus gallus*

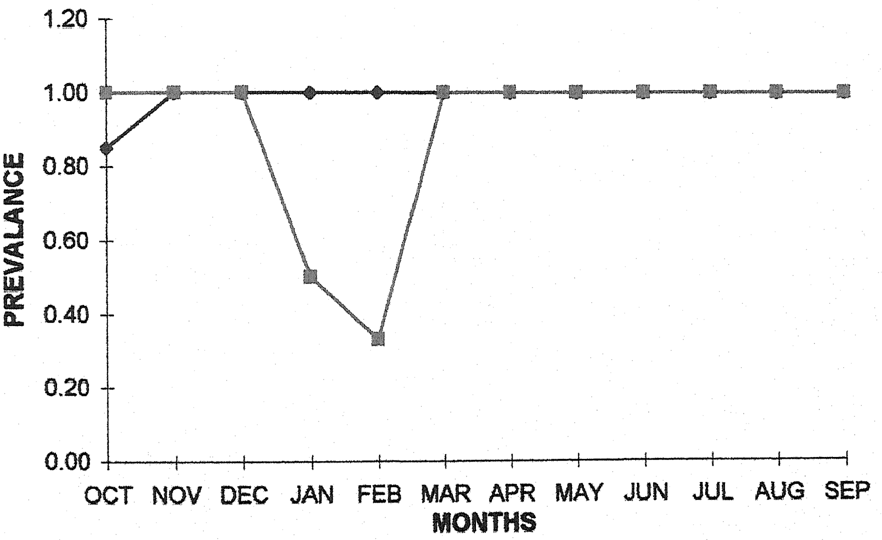


Fig 40: Monthwise variations in prevalence of helminths in *Gallus gallus*

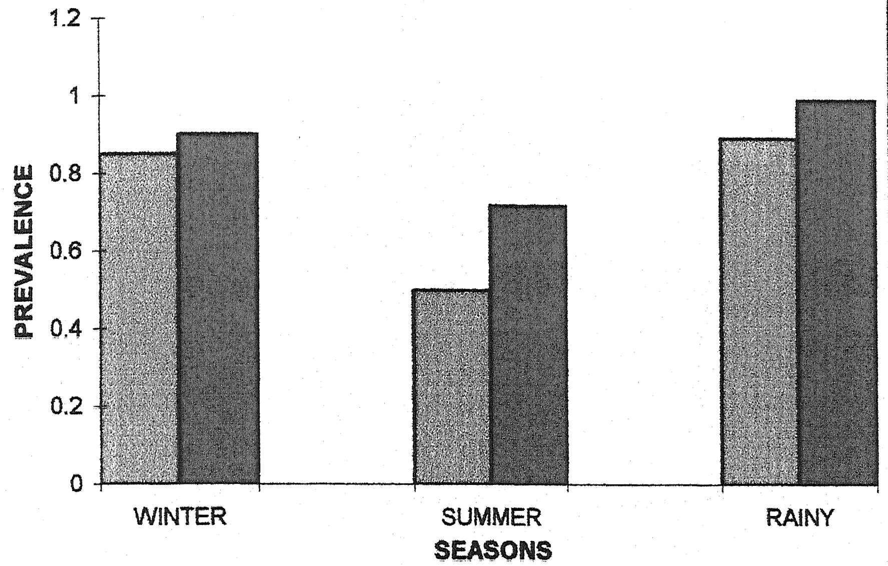


Fig 41:Seasonal variations in prevalence of cestodes in *Gallus gallus*

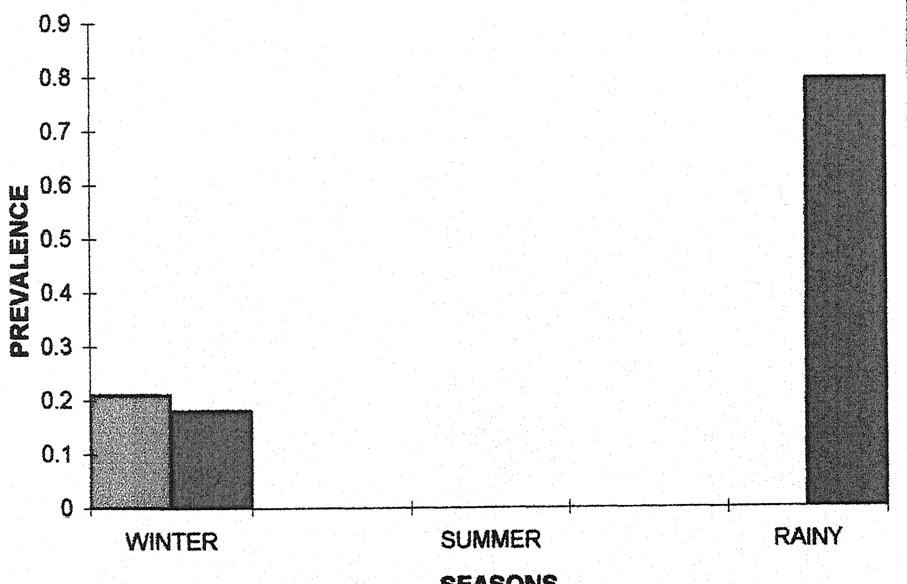


Fig 42:Seasonal variations in prevalence of trematodes in *Gallus gallus*

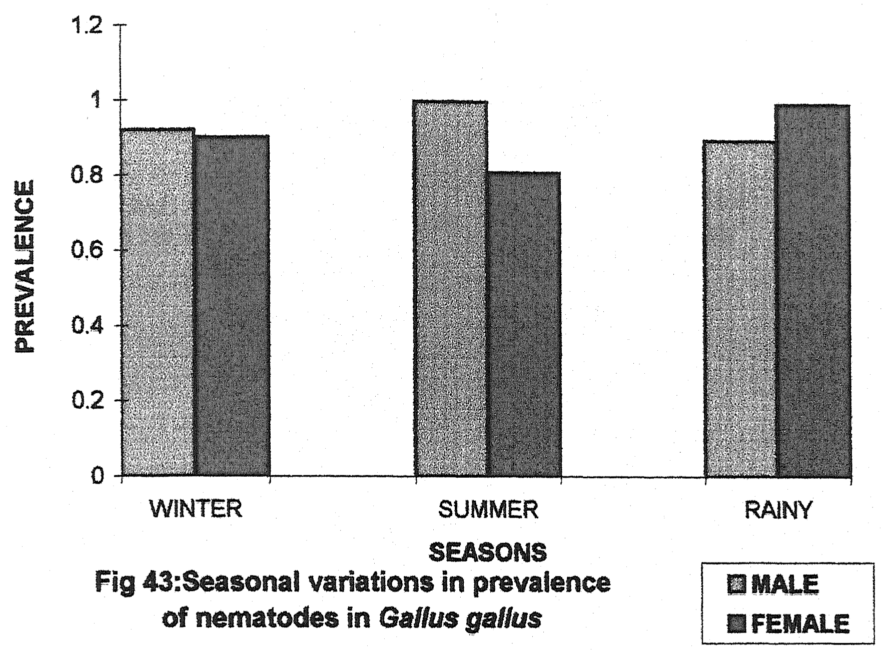


Fig 43:Seasonal variations in prevalence of nematodes in *Gallus gallus*

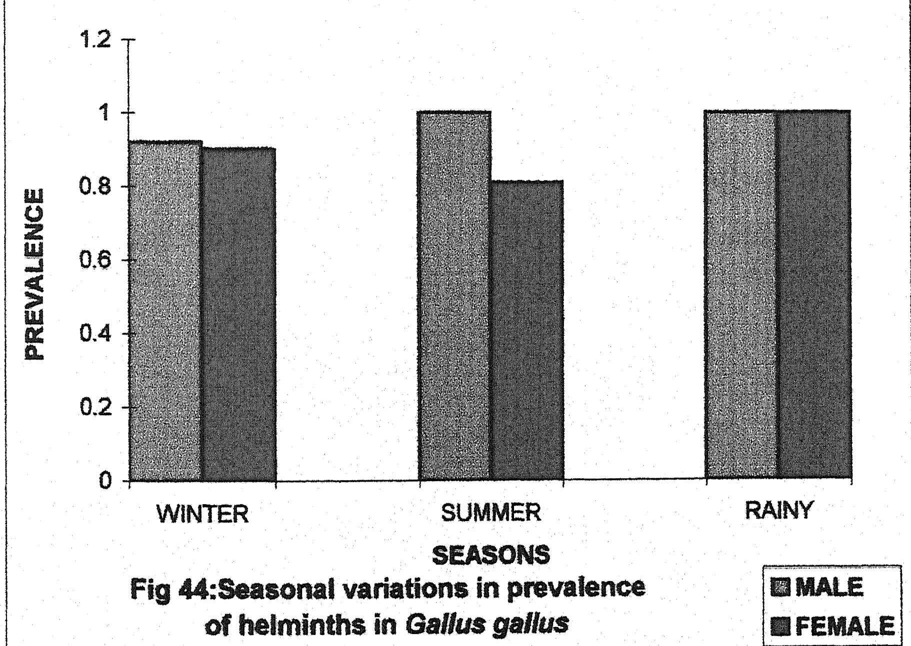


Fig 44:Seasonal variations in prevalence of helminths in *Gallus gallus*

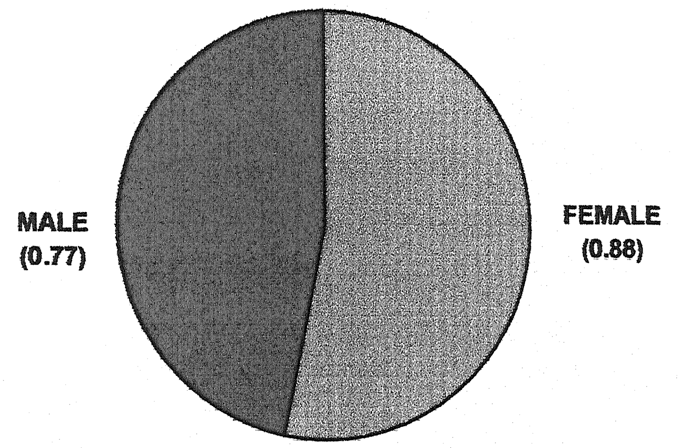


Fig 45:Annual variations in prevalence of cestodes in *Gallus gallus*

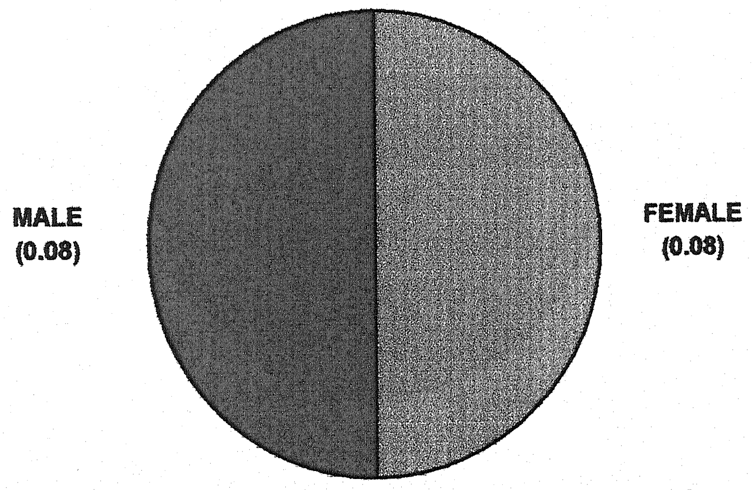


Fig 46:Annual variations in prevalence of trematodes in *Gallus gallus*

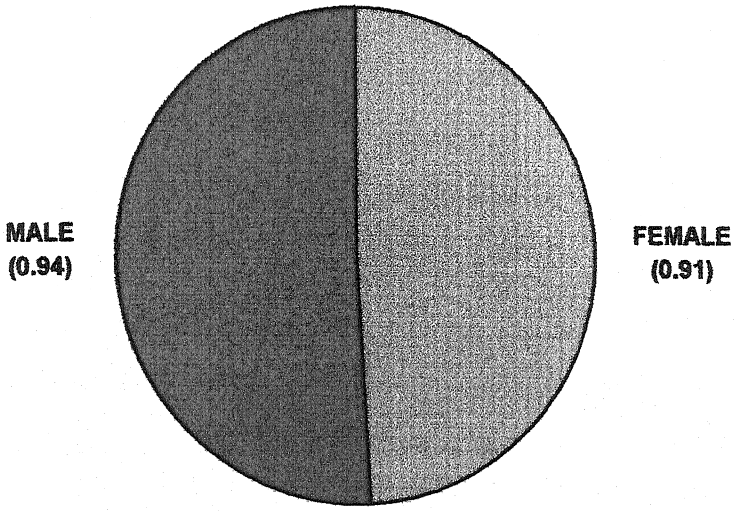


Fig 47:Annual variations in prevalence of nematodes in *Gallus gallus*

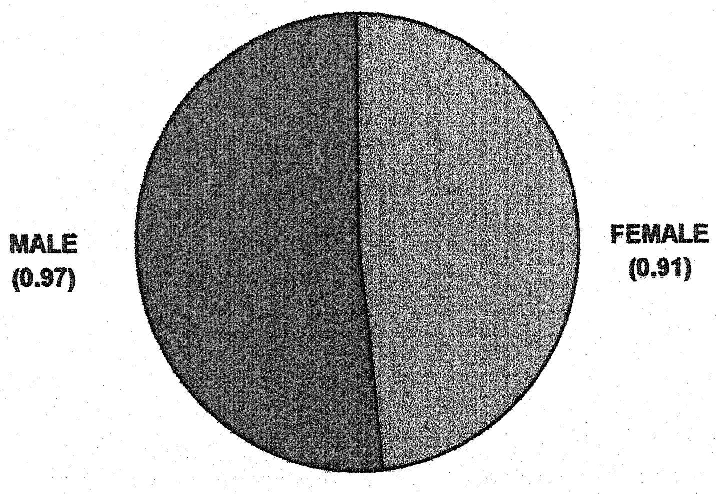


Fig 48:Annual variations in prevalence of helminths in *Gallus gallus*

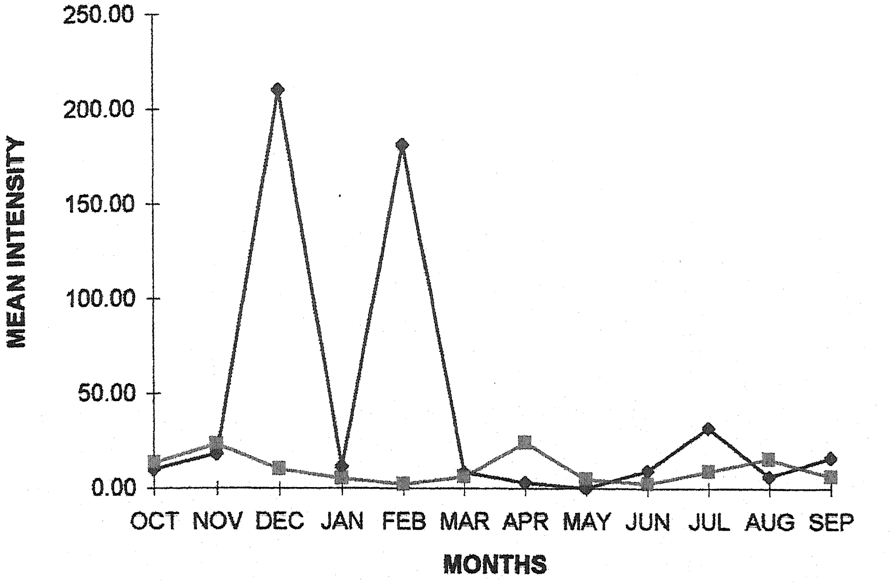


Fig 49:Monthwise variations in mean intensity of cestodes in *Gallus gallus*

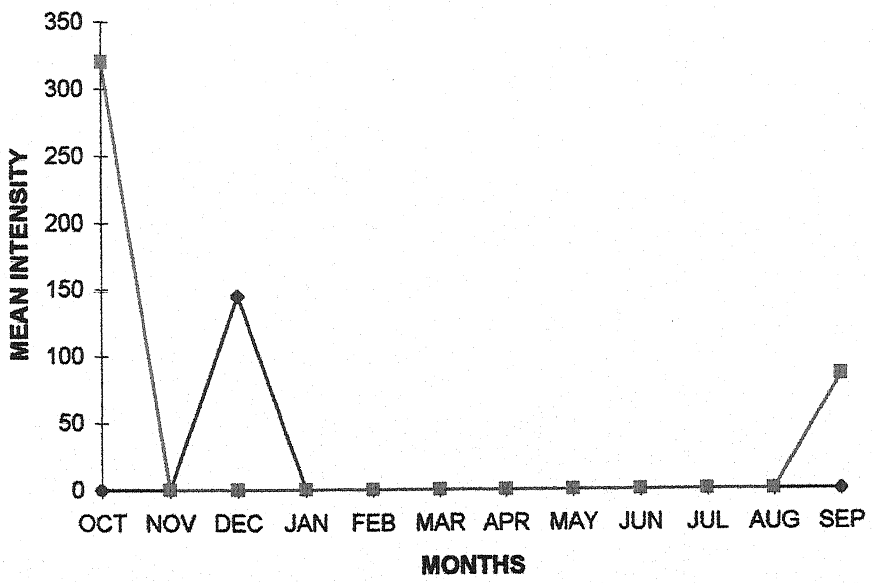


Fig 50:Monthwise variations in mean intensity of trematodes in *Gallus gallus*

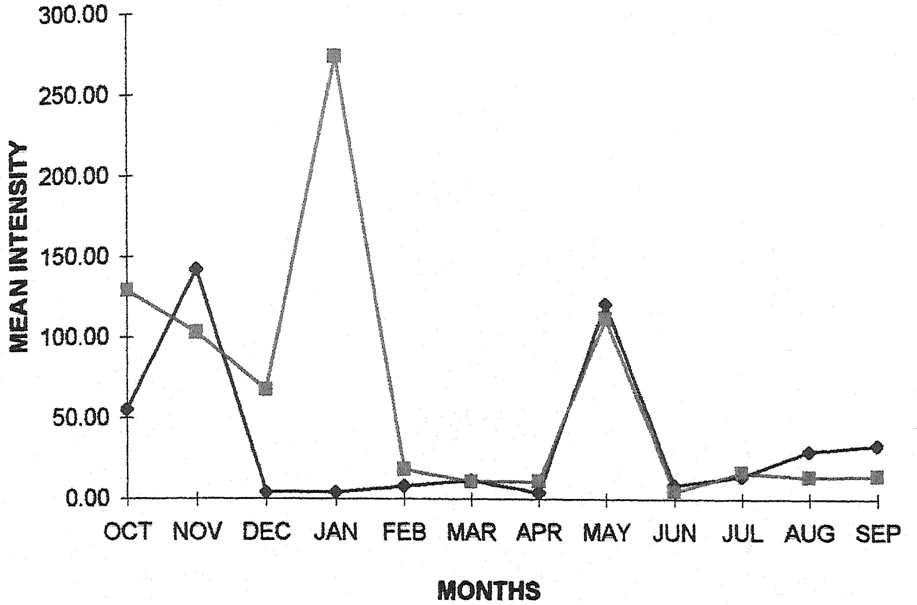


Fig 51:Monthwise variations in mean intensity of nematodes in *Gallus gallus*

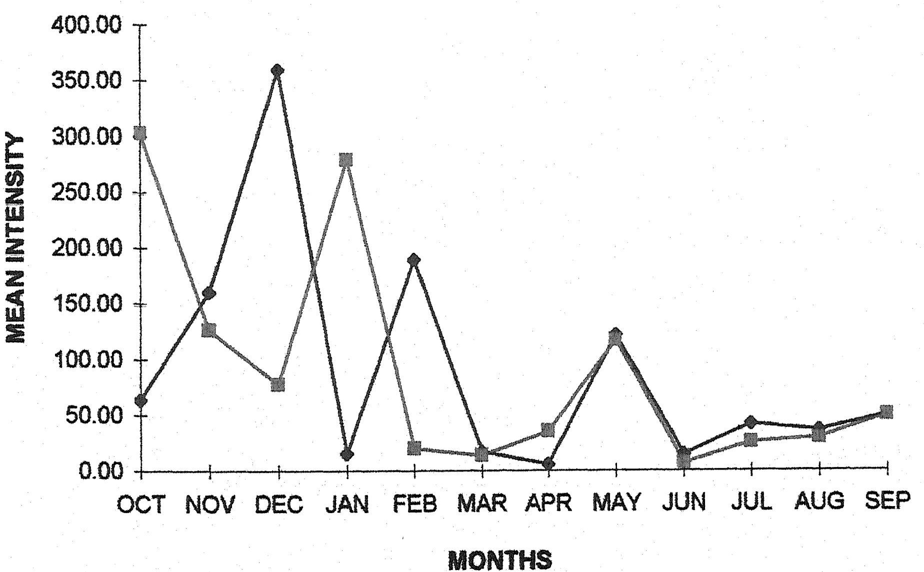


Fig 52:Monthwise variations in mean intensity of helminths in *Gallus gallus*

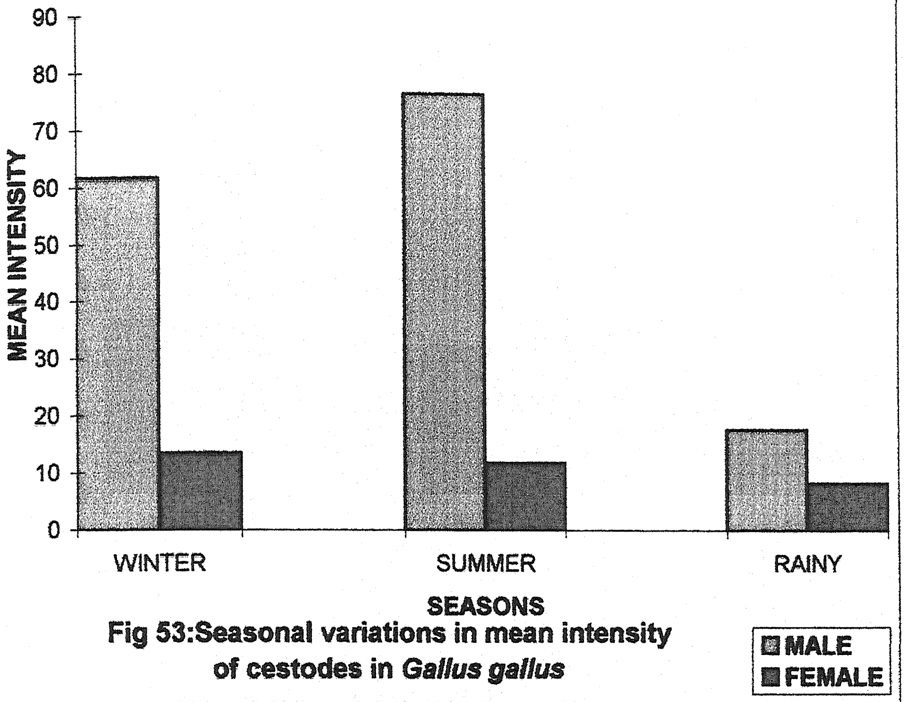


Fig 53:Seasonal variations in mean intensity of cestodes in *Gallus gallus*

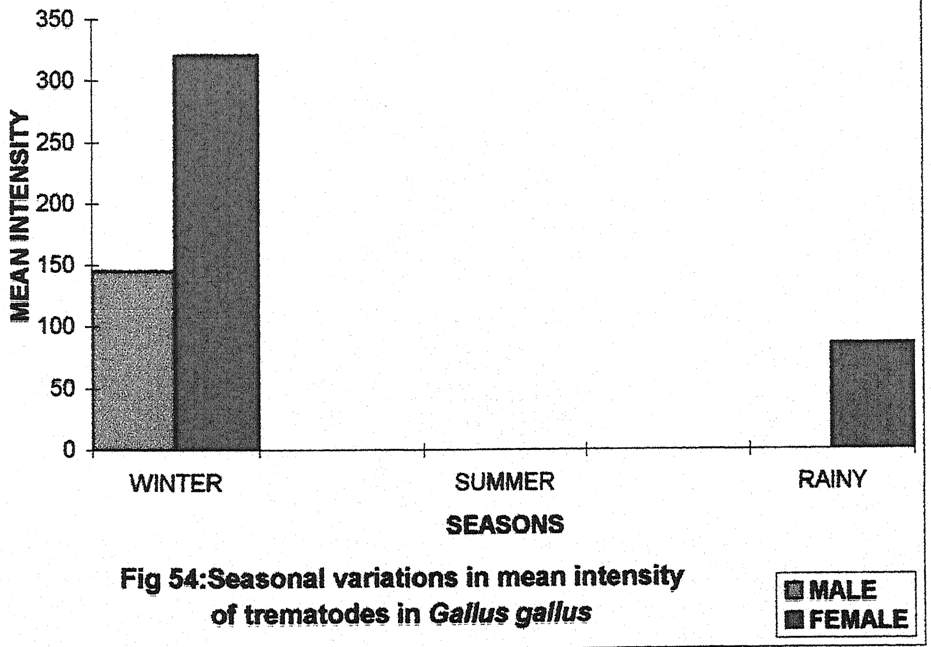


Fig 54:Seasonal variations in mean intensity of trematodes in *Gallus gallus*

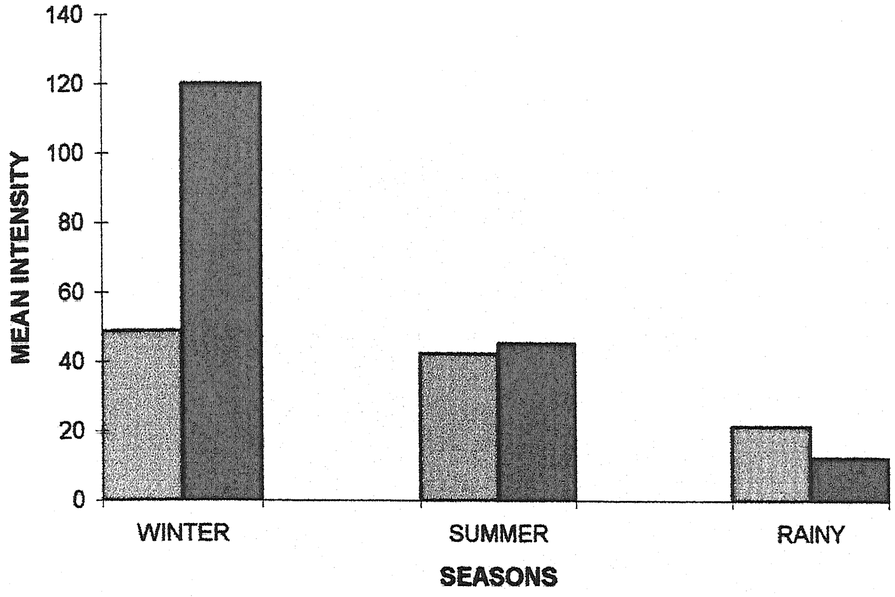


Fig 55:Seasonal variations in mean intensity of nematodes in *Gallus gallus*

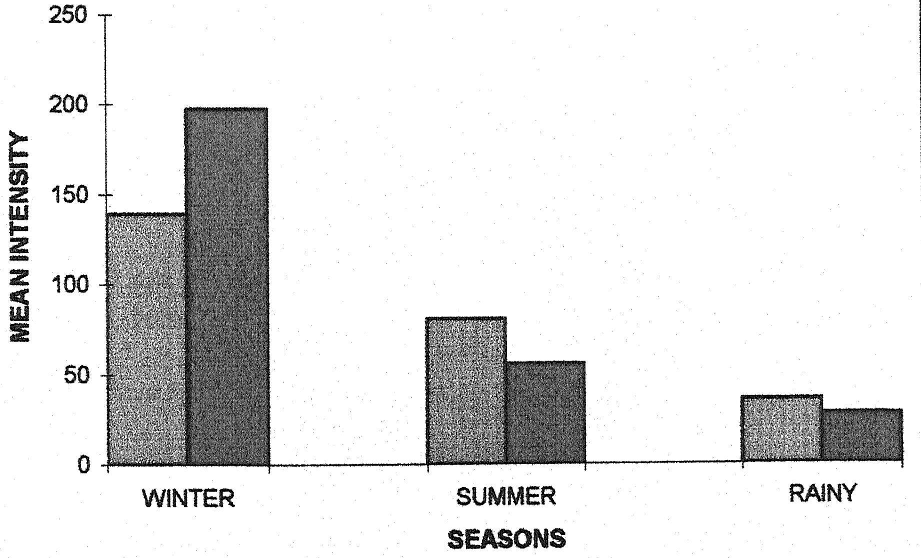


Fig 56:Seasonal variations in mean intensity of helminths in *Gallus gallus*

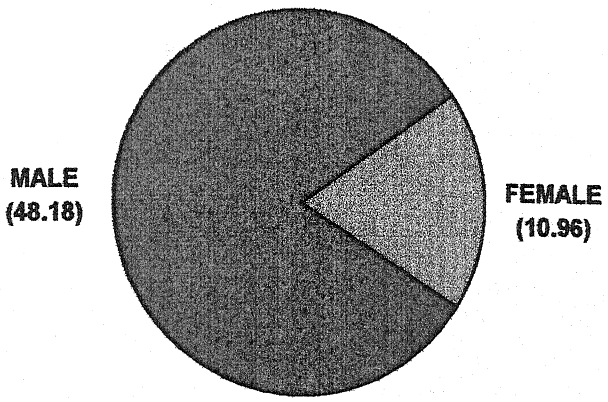


Fig 57:Annual variations in mean intensity of cestodes in *Gallus gallus*

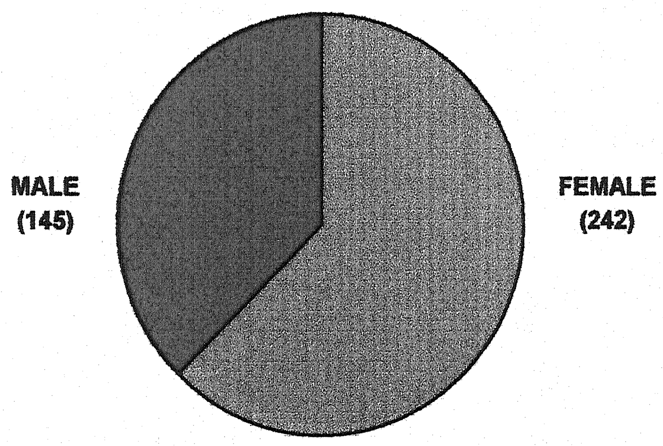


Fig 58:Annual variations in mean intensity of trematodes in *Gallus gallus*

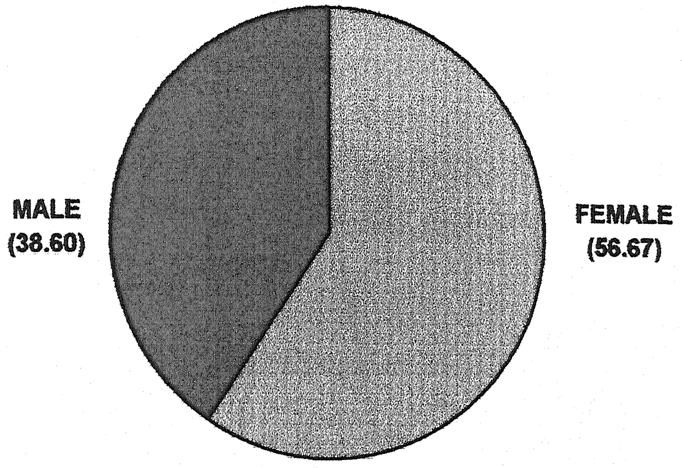


Fig 59:Annual variations in mean intensity of nematodes in *Gallus gallus*

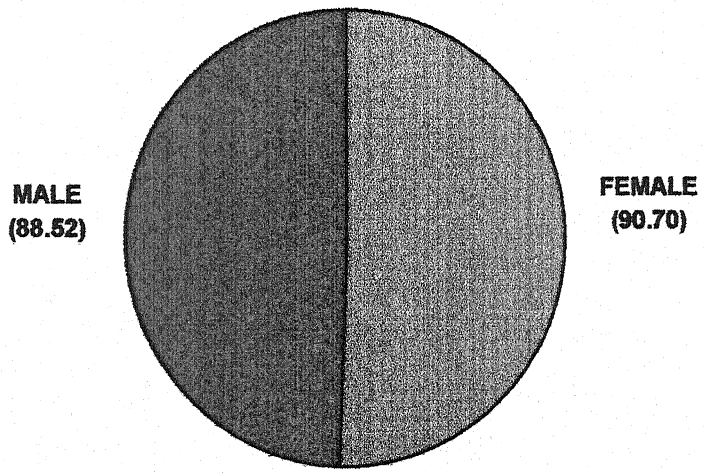


Fig 60:Annual variations in mean intensity of helminths in *Gallus gallus*

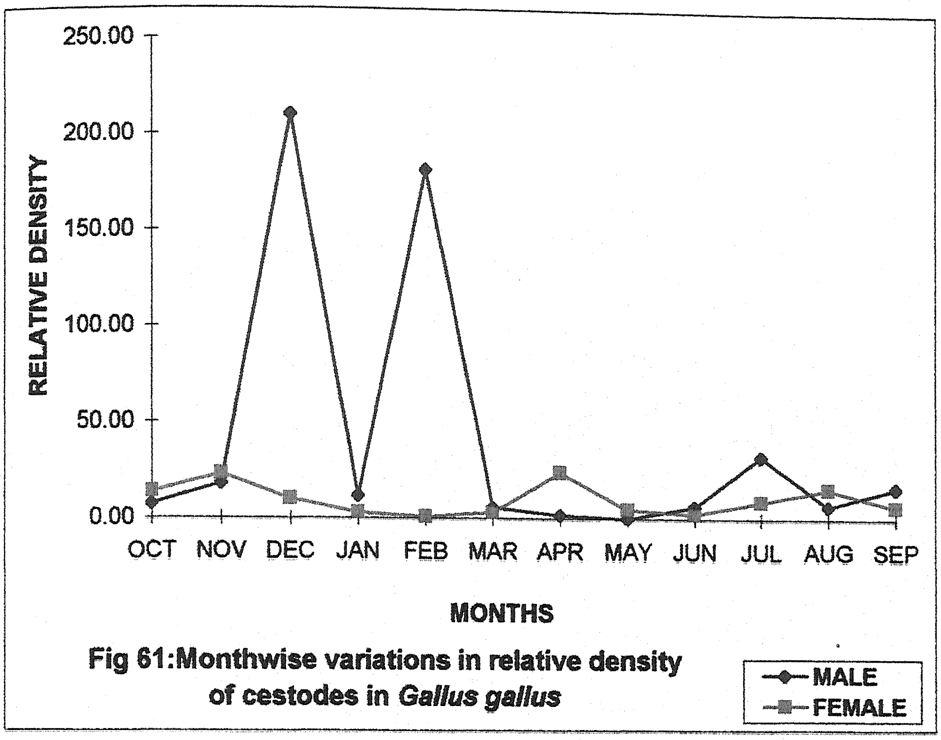


Fig 61:Monthwise variations in relative density of cestodes in *Gallus gallus*

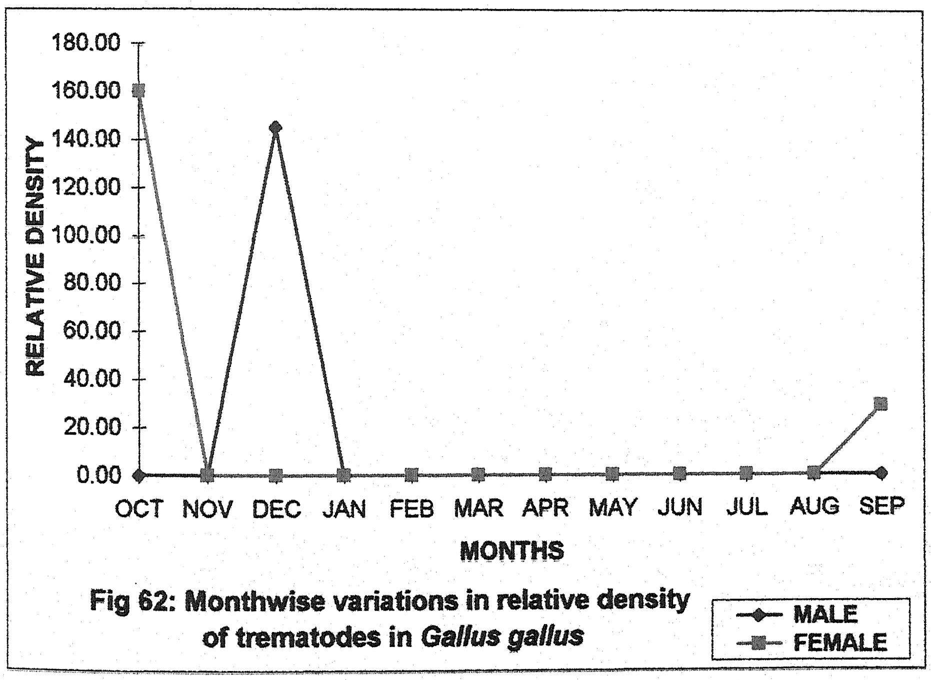


Fig 62: Monthwise variations in relative density of trematodes in *Gallus gallus*

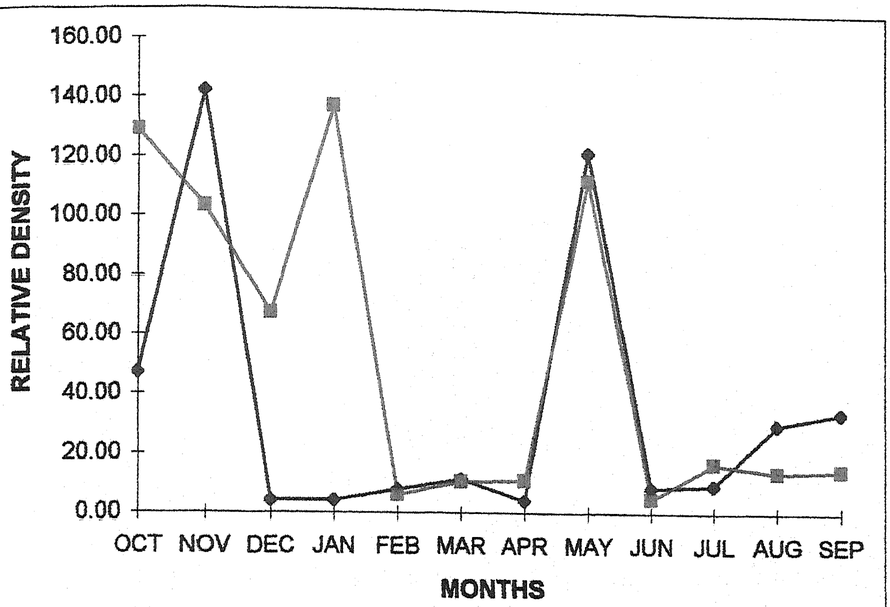


Fig 63: Monthwise variations in relative density of nematodes in *Gallus gallus*

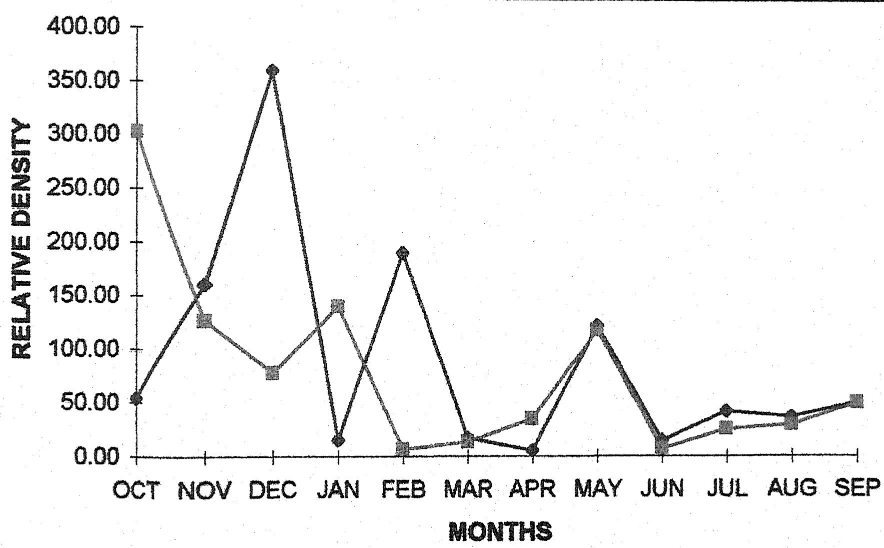


Fig 64: Monthwise variations in relative density of helminths in *Gallus gallus*

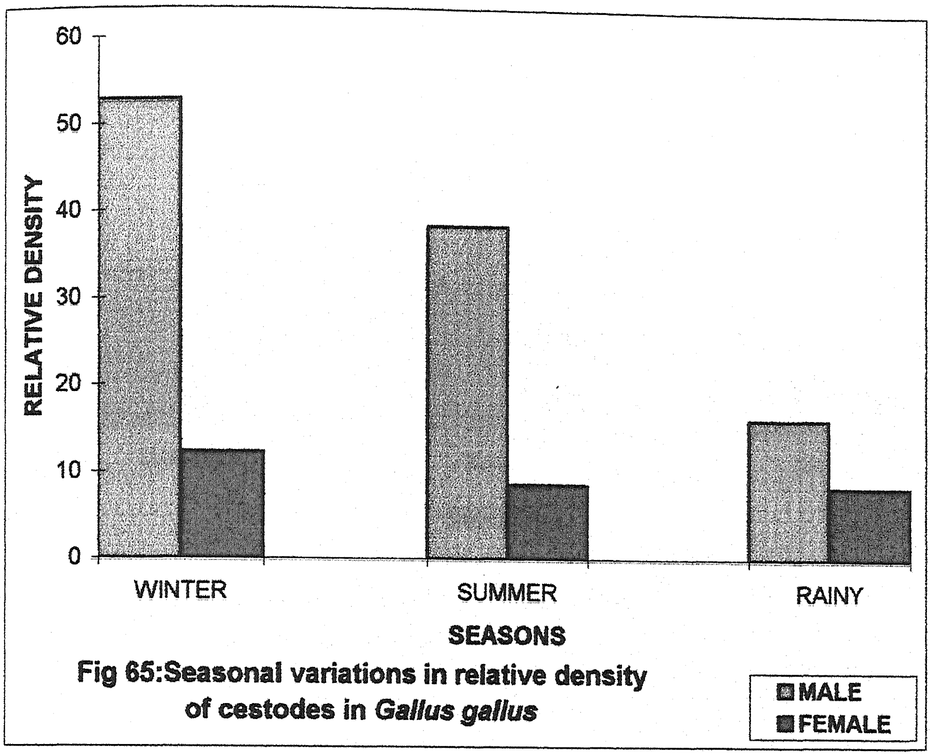


Fig 65:Seasonal variations in relative density of cestodes in *Gallus gallus*

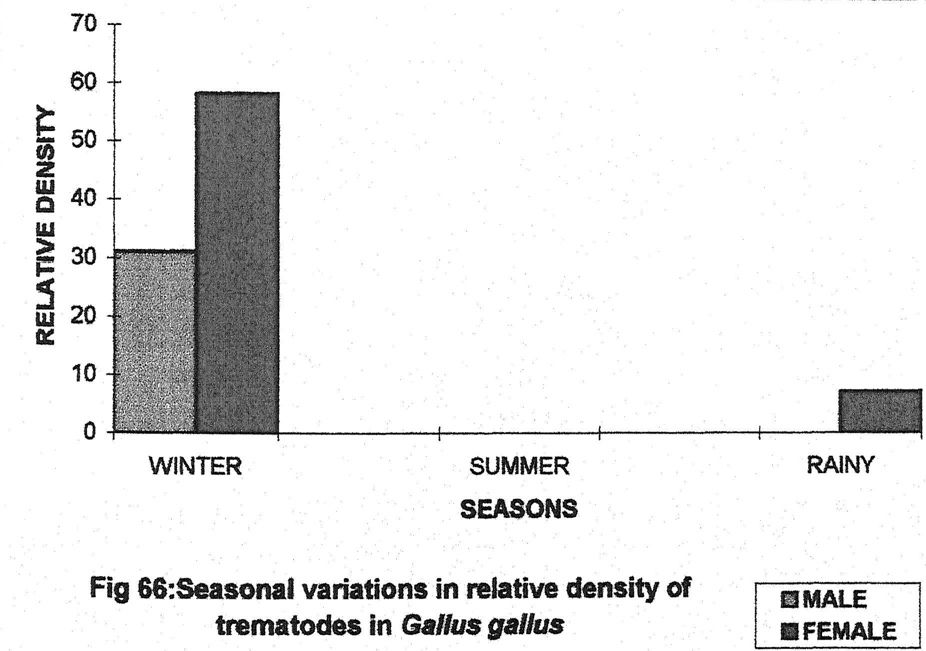


Fig 66:Seasonal variations in relative density of trematodes in *Gallus gallus*

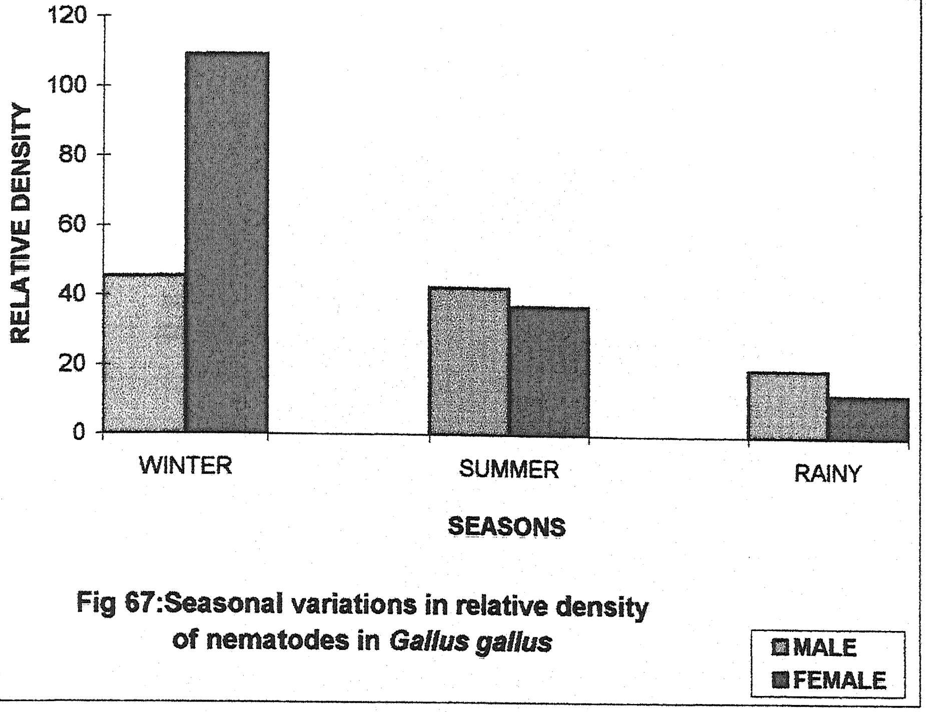


Fig 67:Seasonal variations in relative density of nematodes in *Gallus gallus*

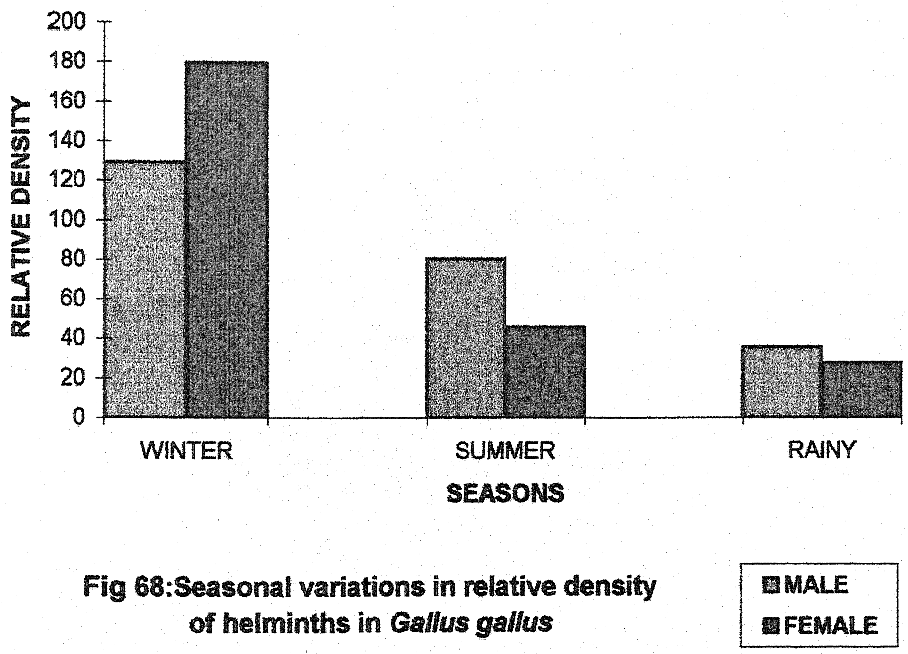


Fig 68:Seasonal variations in relative density of helminths in *Gallus gallus*

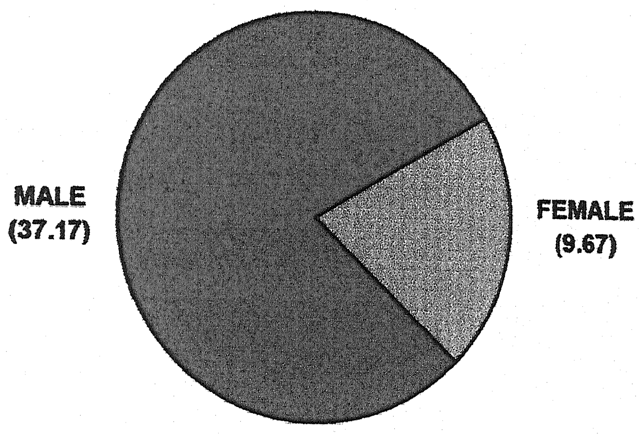


Fig 69:Annual variations in relative density of cestodes in *Gallus gallus*

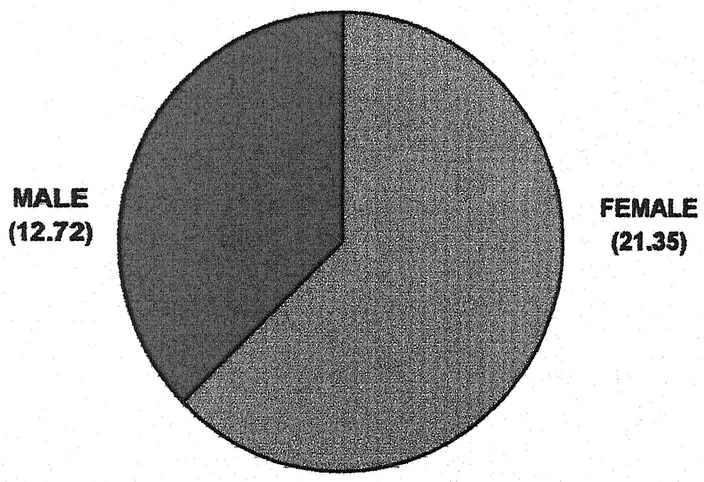


Fig 70:Annual variations in relative density of trematodes in *Gallus gallus*

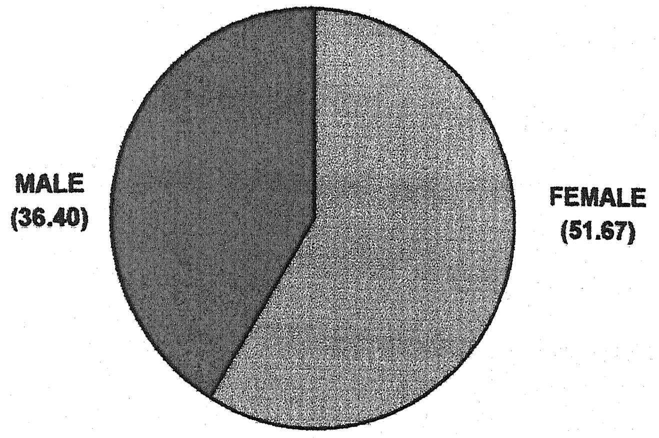


Fig 71:Annual variations in relative density of nematodes in *Gallus gallus*

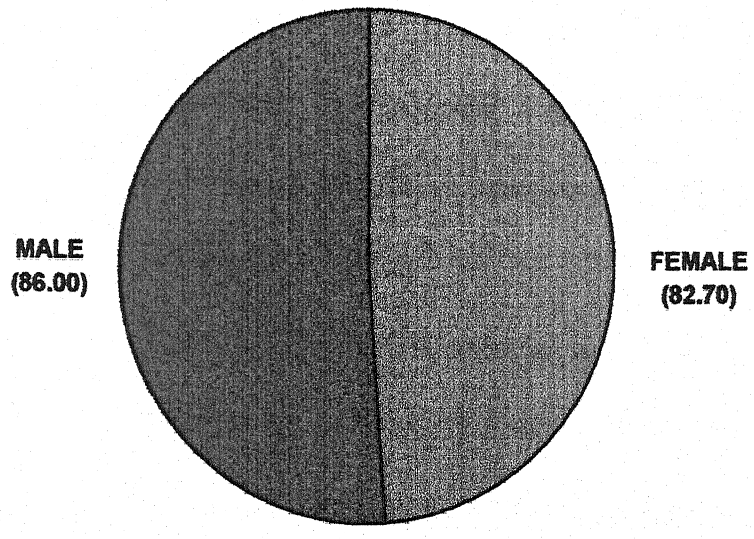


Fig 72:Annual variations in relative density of helminths in *Gallus gallus*

Common rat, *Rattus rattus* (Linnaeus)

In the present studies of *Rattus rattus* (Linnaeus), a total number of 54 hosts were examined and 179 helminth parasites were obtained from the gall bladder and intestine of the hosts. They include 95 cestodes, 70 nematodes, 14 acanthocephala and no trematode.

PREVALENCE

Average monthwise variations of :

Cestode : Table – 43, 44. Figure – 73.

The monthwise prevalence in male rats is zero in November and December, low in October and moderate in January, February and March. High prevalence is seen in April,May, June, July, August and September.

The monthwise prevalence in female rats is zero in December and March and moderate in October, June and July. High prevalence is recorded in November, January, February, April, May, August and September.

Trematode :

The monthwise prevalence is zero in both the male and female rats in all the months of the year from October to September.

Nematode : Table – 45, 46. Figure – 74.

The monthwise prevalence in male rats is zero in October, December, February, April and May and low in November. Moderate prevalence is seen in March, June, August and high in January and July.

The monthwise prevalence in female rats is zero in November, February, March and April and low in October and December. Moderate prevalence is recorded in September and high in January, May, June, July and August.

Acanthocephala : Table – 47, 48. Figure – 75.

The monthwise prevalence in male rats is zero in all the months of the year except November where it is low.

The monthwise prevalence in female rats is zero in all the months of the year except December where it is low.

Helminth : Table – 49, 50. Figure – 76.

The monthwise prevalence in male rats is zero in December and low in October. Moderate prevalence is seen in November and February and high prevalence is recorded in January, March, April, May, June, July, August and September.

The monthwise prevalence in female rats is zero in March and low in December. High prevalence is seen in October, November, January, February, April, May, June, July, August and September.

Average seasonal variations of :

Cestode : Table – 51. Figure – 77.

The seasonal prevalence in male rats is low in winter season and high in summer and rainy seasons of the year.

The seasonal prevalence in female rats is moderate in winter season and high in summer and rainy seasons of the year.

Trematode :

The seasonal prevalence is zero in both the male and female rats in all the seasons of the year.

Nematode : Table – 52. Figure – 78.

The seasonal prevalence in male rats is low in winter and summer seasons and moderate in rainy season of the year.

The seasonal prevalence in female rats is low in summer season, moderate in winter season and high in rainy season of the year.

Acanthocephala : Table – 53. Figure – 79.

The seasonal prevalence in male rats is zero in summer and rainy seasons and low in winter season of the year.

The seasonal prevalence in female rats is zero in summer and rainy seasons and low in winter season of the year.

Helminth : Table – 54. Figure – 80.

The seasonal prevalence in male rats is moderate in winter season and high in summer and rainy seasons of the year.

The seasonal prevalence in female rats is recorded high in winter, summer and rainy seasons of the year.

Average annual variations of :

Cestode : Table – 55. Figure – 81.

The annual prevalence is moderate in male rats and high in female rats. The prevalence is higher in females than the males.

Trematode :

The annual prevalence is zero in both the male and female rats.

Nematode : Table – 56. Figure – 82.

The annual prevalence is moderate in both the male and female rats. The prevalence is higher in females than the males.

Acanthocephala : Table – 57. Figure – 83.

The annual prevalence is low in both the male and female rats. The prevalence is higher in males than the females.

Helminth : Table – 58. Figure – 84.

The annual prevalence is high in both the male and female rats. The prevalence is higher in females than the males.

MEAN INTENSITY

Average monthwise variations of :

Cestode : Table – 43, 44. Figure – 85.

The monthwise mean intensity in male rats is zero in November and December, low in October, January, February, March, April, May, June, July, August and September.

The monthwise mean intensity in female rats is zero in December and March and low in October, November, January, February, April, May, June, July, August and September.

Trematode :

The monthwise mean intensity is zero in both the male and female rats in all the months of the year from October to September.

Nematode : Table – 45, 46. Figure – 86.

The monthwise mean intensity in male rats is zero in October, December, February, April and May and low in November, January, March, June, July, August and September.

The monthwise mean intensity in female rats is zero in November, February, March and April and low in October, December, January, May, June, July, August and September.

Acanthocephala : Table – 47, 48. Figure – 87.

The monthwise mean intensity in male rats is low in November and zero in rest of the months of the year.

The monthwise mean intensity in female rats is low in December and zero in the rest of the months of the year.

Helminth : Table – 49, 50. Figure – 88.

The monthwise mean intensity in male rats is zero in December and low in rest of the months of the year.

The monthwise mean intensity in female rats is zero in March and low in the rest of the months of the year.

Average seasonal variations of :

Cestode : Table – 51. Figure – 89.

The seasonal mean intensity is low in both the male and female rats in all the seasons of the year.

Trematode :

The seasonal mean intensity is zero in both the male and female rats in all the seasons of the year.

Nematode : Table – 52. Figure – 90.

The seasonal mean intensity is low in both the male and female rats in all the seasons of the year.

Acanthocephala : Table – 53. Figure – 91.

The seasonal mean intensity is zero in both the male and female rats in summer and rainy seasons and low in winter season of the year.

Helminth : Table – 54. Figure – 92.

The seasonal mean intensity is low in both the male and female rats in all the seasons of the year.

Average annual variations of :

Cestode : Table – 55. Figure – 93.

The annual mean intensity is low in both the male and female rats. It is higher in males than the females.

Trematode :

The annual mean intensity is zero in both the male and female rats.

Nematode : Table – 56. Figure – 94.

The annual mean intensity is low in both the male and female rats. It is higher in females than the males.

Acanthocephala : Table – 57. Figure – 95.

The annual mean intensity is low in both the male and female rats. It is higher in males than the females.

Helminth : Table – 58. Figure – 96.

The annual mean intensity is low in both the male and female rats. It is higher in females than the males.

RELATIVE DENSITY

Average monthwise variations of :

Cestode : Table – 43, 44. Figure – 97.

The monthwise relative density in male rats is zero in November and December and low in the rest of the months of the year.

The monthwise relative density in female rats is zero in December and March and low in the rest of the months of the year.

Trematode :

The monthwise relative density is zero in both the male and female rats in all the months of the year from October to September.

Nematode : Table – 45, 46. Figure – 98.

The monthwise relative density in male rats is zero in October, December, February, April and May and low in November, January, March, June, July, August and September.

The monthwise relative density in female rats is zero in November, February, March and April and low in October, December, January, May, June, July, August and September.

Acanthocephala : Table – 47, 48. Figure – 99.

The monthwise relative density in male rats is low in November and zero in the rest of the months of the year.

The monthwise relative density in female rats is low in December and zero in the rest of the months of the year.

Helminth : Table – 49, 50. Figure – 100.

The monthwise relative density in male rats is zero in December and low in the rest of the months of the year.

The monthwise relative density in female rats is zero in March and low in the rest of the months of the year.

Average seasonal variations of :

Cestode : Table – 51. Figure – 101.

The seasonal relative density is low in both the male and female rats in all the seasons of the year.

Trematode :

The seasonal relative density is zero in both the male and female rats in all the seasons of the year.

Nematode : Table – 52. Figure – 102.

The seasonal relative density is low in both the male and female rats in all the seasons of the year.

Acanthocephala : Table – 53. Figure – 103.

The seasonal relative density is zero in both the male and female rats in summer and rainy seasons and low in the winter season of the year.

Helminth : Table – 54. Figure – 104.

The seasonal relative density is low in both the male and female rats in all the seasons of the year.

Average annual variations of :

Cestode : Table – 55. Figure – 105.

The annual relative density is low in both the male and female rats. It is higher in females than the males.

Trematode :

The annual relative density is zero in both the male and female rats.

Nematode : Table – 56. Figure – 106.

The annual relative density is low in both the male and female rats. It is higher in females than the males.

Acanthocephala : Table – 57. Figure – 107.

The annual relative density is low in both the male and female rats. It is higher in males than the females.

Helminth : Table – 58. Figure – 108.

The annual relative density is low in both the male and female rats. It is higher in females than the males

Table 43. Average Monthwise Variations in Prevalence, Mean intensity and Relative density of Cestode Parasites of *Rattus rattus* (Male).

Months	No. of Host examined	No. of Host infected	No. of Cestodes obtained	Prevalence	Mean intensity	Relative density
October	3	1	4	0.33	4.00	1.33
November	3	0	0	0.00	0.00	0.00
December	1	0	0	0.00	0.00	0.00
January	2	1	1	0.50	1.00	0.50
February	2	1	16	0.50	16.00	8.00
March	2	1	5	0.50	5.00	2.50
April	2	2	2	1.00	1.00	1.00
May	2	2	2	1.00	1.00	1.00
June	2	2	2	1.00	1.00	1.00
July	2	2	3	1.00	1.50	1.50
August	2	2	4	1.00	2.00	2.00
September	2	2	3	1.00	1.50	1.50

Table 44. Average Monthwise Variations in Prevalence, Mean intensity and Relative density of Cestode Parasites of *Rattus rattus* (Female).

Months	No. of Host examined	No. of Host infected	No. of Cestodes obtained	Prevalence	Mean intensity	Relative density
October	3	2	3	0.66	1.50	1.00
November	1	1	3	1.00	3.00	3.00
December	3	0	0	0.00	0.00	0.00
January	2	2	3	1.00	1.50	1.50
February	2	2	19	1.00	9.50	9.50
March	2	0	0	0.00	0.00	0.00
April	4	4	8	1.00	2.00	2.00
May	2	2	3	1.00	1.50	1.50
June	2	1	1	0.50	1.00	0.50
July	2	1	1	0.50	1.00	0.50
August	2	2	3	1.00	1.50	1.50
September	4	4	9	1.00	2.25	2.25

Table 45. Average Monthwise Variations in Prevalence, Mean intensity and Relative density of Nematode Parasites of *Rattus rattus* (Male).

Months	No. of Host examined	No. of Host infected	No. of Nematodes obtained	Prevalence	Mean intensity	Relative density
October	3	0	0	0.00	0.00	0.00
November	3	1	2	0.33	2.00	0.66
December	1	0	0	0.00	0.00	0.00
January	2	2	4	1.00	2.00	2.00
February	2	0	0	0.00	0.00	0.00
March	2	1	6	0.50	6.00	3.00
April	2	0	0	0.00	0.00	0.00
May	2	0	0	0.00	0.00	0.00
June	2	1	1	0.50	1.00	0.50
July	2	2	3	1.00	1.50	1.50
August	2	1	1	0.50	1.00	0.50
September	2	1	1	0.50	1.00	0.50

Table 46. Average Monthwise Variations in Prevalence, Mean intensity and Relative density of Nematode Parasites of *Rattus rattus* (Female).

Months	No. of Host examined	No. of Host infected	No. of Nematodes obtained	Prevalence	Mean intensity	Relative density
October	3	1	7	0.33	7.00	2.33
November	1	0	0	0.00	0.00	0.00
December	3	1	16	0.33	16.00	5.33
January	2	2	12	1.00	6.00	6.00
February	2	0	0	0.00	0.00	0.00
March	2	0	0	0.00	0.00	0.00
April	4	0	0	0.00	0.00	0.00
May	2	2	2	1.00	1.00	1.00
June	2	2	3	1.00	1.50	1.50
July	2	2	4	1.00	2.00	2.00
August	2	2	5	1.00	2.50	2.50
September	4	2	3	0.50	1.50	0.75

Table 47. Average Monthwise Variations in Prevalence, Mean intensity and Relative density of Acanthocephala Parasites of *Rattus rattus* (Male).

Months	No. of Host examined	No. of Host infected	No. of Acanthocephala obtained	Prevalence	Mean intensity	Relative density
October	3	0	0	0	0	0
November	3	2	11	0.66	5.5	3.66
December	1	0	0	0	0	0
January	2	0	0	0	0	0
February	2	0	0	0	0	0
March	2	0	0	0	0	0
April	2	0	0	0	0	0
May	2	0	0	0	0	0
June	2	0	0	0	0	0
July	2	0	0	0	0	0
August	2	0	0	0	0	0
September	2	0	0	0	0	0

Table 48. Average Monthwise Variations in Prevalence, Mean intensity and Relative density of Acanthocephala Parasites of *Rattus rattus* (Female).

Months	No. of Host examined	No. of Host infected	No. of Acanthocephala obtained	Prevalence	Mean intensity	Relative density
October	3	0	0	0	0	0
November	1	0	0	0	0	0
December	3	1	3	0.33	3	1
January	2	0	0	0	0	0
February	2	0	0	0	0	0
March	2	0	0	0	0	0
April	4	0	0	0	0	0
May	2	0	0	0	0	0
June	2	0	0	0	0	0
July	2	0	0	0	0	0
August	2	0	0	0	0	0
September	4	0	0	0	0	0

Table 49. Average Monthwise Variations in Prevalence, Mean intensity and Relative density of Helminth Parasites of *Rattus rattus* (Male).

Months	No. of Host examined	No. of Host infected	No. of Helminths obtained	Prevalence	Mean intensity	Relative density
October	3	1	4	0.33	4.00	1.33
November	3	2	13	0.66	6.50	4.33
December	1	0	0	0.00	0.00	0.00
January	2	2	5	1.00	2.50	2.50
February	2	1	16	0.50	16.00	8.00
March	2	2	11	1.00	5.50	5.50
April	2	2	2	1.00	1.00	1.00
May	2	2	2	1.00	1.00	1.00
June	2	2	3	1.00	1.50	1.50
July	2	2	6	1.00	3.00	3.00
August	2	2	5	1.00	2.50	2.50
September	2	2	4	1.00	2.00	2.00

Table 50. Average Monthwise Variations in Prevalence, Mean intensity and Relative density of Helminth Parasites of *Rattus rattus* (Female).

Months	No. of Host examined	No. of Host infected	No. of Helminths obtained	Prevalence	Mean intensity	Relative density
October	3	3	10	1.00	3.33	3.33
November	1	1	3	1.00	3.00	3.00
December	3	1	19	0.33	19.00	6.33
January	2	2	15	1.00	7.50	7.50
February	2	2	19	1.00	9.50	9.50
March	2	0	0	0.00	0.00	0.00
April	4	4	8	1.00	2.00	2.00
May	2	2	5	1.00	2.50	2.50
June	2	2	4	1.00	2.00	2.00
July	2	2	5	1.00	2.50	2.50
August	2	2	8	1.00	4.00	4.00
September	4	4	12	1.00	3.00	3.00

Table 51. Seasonal Variations in Prevalence, Mean intensity and Relative density of Cestode Parasites of *Rattus rattus* in relation to the sex of host.

Season	Sex of Host	No. of Host examined	No. of Host infected	No. of Cestodes obtained	Prevalence	Mean intensity	Relative density
Winter	Male	9	2	5	0.22	2.50	0.55
Summer	Male	8	6	25	0.75	4.16	3.12
Rainy	Male	8	8	12	1.00	1.50	1.50
Winter	Female	9	5	9	0.55	1.80	1.00
Summer	Female	10	8	30	0.80	3.75	3.00
Rainy	Female	10	8	14	0.80	1.75	1.40

Table 52. Seasonal Variations in Prevalence, Mean intensity and Relative density of Nematode Parasites of *Rattus rattus* in relation to the sex of host.

Season	Sex of Host	No. of Host examined	No. of Host infected	No. of Nematodes obtained	Prevalence	Mean intensity	Relative density
Winter	Male	9	3	6	0.33	2.00	0.66
Summer	Male	8	1	6	0.12	6.00	0.75
Rainy	Male	8	5	6	0.62	1.20	0.75
Winter	Female	9	4	35	0.44	8.75	3.88
Summer	Female	10	2	2	0.20	1.00	0.20
Rainy	Female	10	8	15	0.80	1.87	1.50

Table 53. Seasonal Variations in Prevalence, Mean intensity and Relative density of Acanthocephala Parasites of *Rattus rattus* in relation to the sex of host.

Season	Sex of Host	No. of Host examined	No. of Host infected	No. of Acanthocephala obtained	Prevalence	Mean intensity	Relative density
Winter	Male	9	2	11	0.22	5.50	1.22
Summer	Male	8	0	0	0.00	0.00	0.00
Rainy	Male	8	0	0	0.00	0.00	0.00
Winter	Female	9	1	3	0.11	3.00	0.33
Summer	Female	10	0	0	0.00	0.00	0.00
Rainy	Female	10	0	0	0.00	0.00	0.00

Table 54. Seasonal Variations in Prevalence, Mean intensity and Relative density of Helminth Parasites of *Rattus rattus* in relation to the sex of host.

Season	Sex of Host	No. of Host examined	No. of Host infected	No. of Helminths obtained	Prevalence	Mean intensity	Relative density
Winter	Male	9	5	22	0.55	4.40	2.40
Summer	Male	8	7	31	0.87	4.42	3.87
Rainy	Male	8	8	18	1.00	2.25	2.25
Winter	Female	9	7	47	0.77	6.71	5.22
Summer	Female	10	8	32	0.80	4.00	3.20
Rainy	Female	10	10	29	1.00	2.90	2.90

Table 55. Annual Variations in Prevalence, Mean intensity and Relative density of Cestodes Parasites of *Rattus rattus* in relation to the sex of host.

Sex of Host	No. of Host examined	No. of Host infected	No. of Cestodes obtained	Prevalence	Mean intensity	Relative density
Male	25	16	42	0.64	2.62	1.68
Female	29	21	53	0.72	2.52	1.82

Table 56. Annual Variations in Prevalence, Mean intensity and Relative density of Nematode Parasites of *Rattus rattus* in relation to the sex of host.

Sex of Host	No. of Host examined	No. of Host infected	No. of Nematode obtained	Prevalence	Mean intensity	Relative density
Male	25	9	18	0.36	2.00	0.72
Female	29	14	52	0.48	3.71	1.79

Table 57. Annual Variations in Prevalence, Mean intensity and Relative density Acanthocephala of Parasites of *Rattus rattus* in relation to the sex of host.

Sex of Host	No. of Host examined	No. of Host infected	No. of Acanthocephala obtained	Prevalence	Mean intensity	Relative density
Male	25	2	11	0.08	5.50	0.44
Female	29	1	3	0.03	3.00	0.10

Table 58. Annual Variations in Prevalence, Mean intensity and Relative density of Helminth Parasites of *Rattus rattus* in relation to the sex of host.

Sex of Host	No. of Host examined	No. of Host infected	No. of Helminth obtained	Prevalence	Mean intensity	Relative density
Male	25	20	71	0.80	3.55	2.84
Female	29	25	108	0.86	4.32	3.72

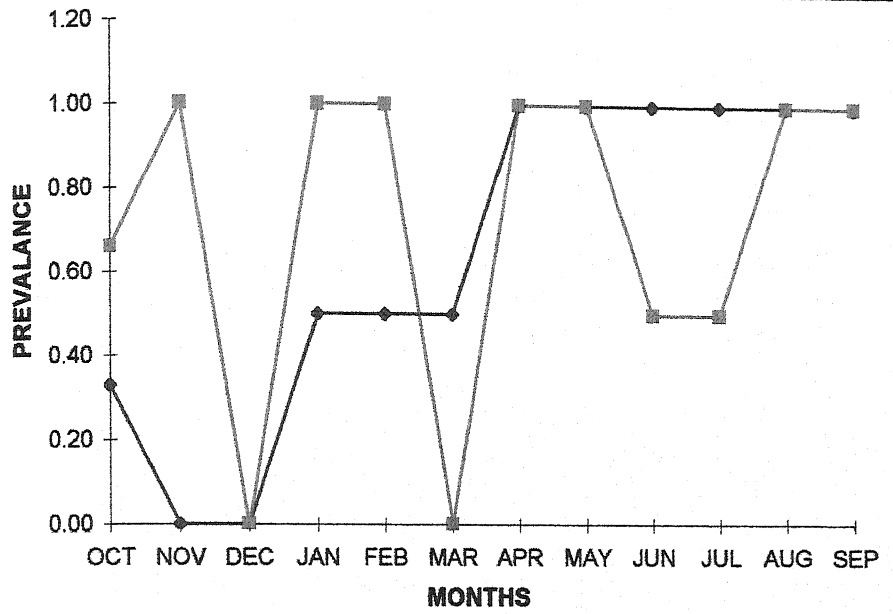


Fig 73: Monthwise variations in prevalence of cestodes in *Rattus rattus*

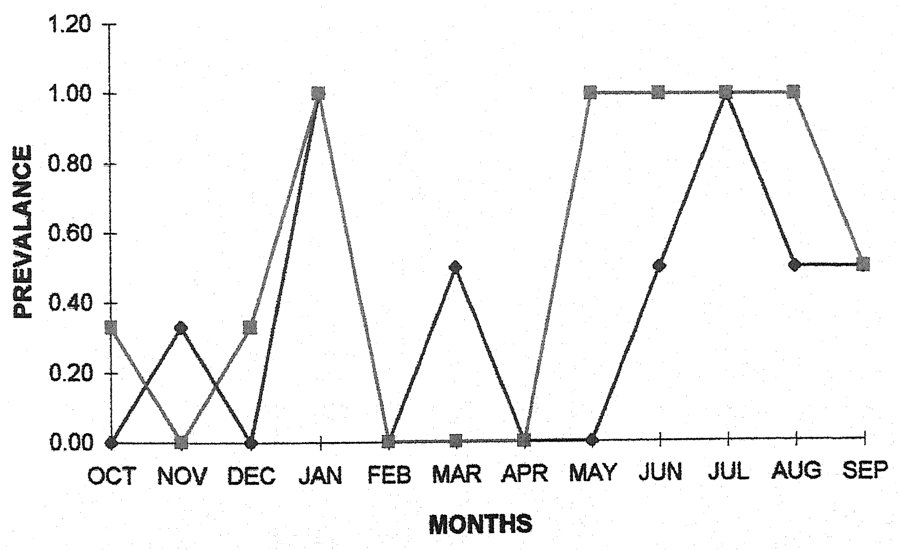


Fig 74:Monthwise variations in prevalence of nematodes in *Rattus rattus*

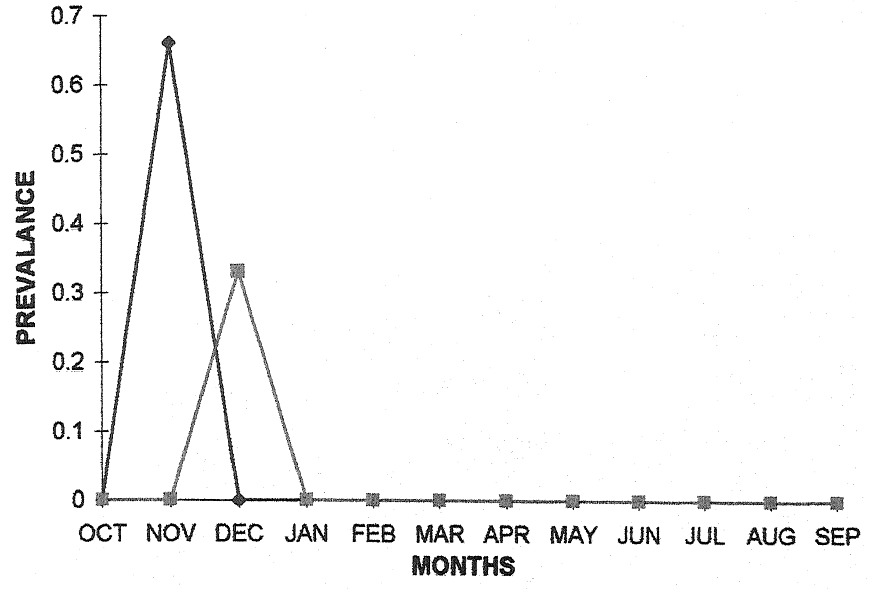


Fig 75:Monthwise variations in prevalence of acanthocephala in *Rattus rattus*

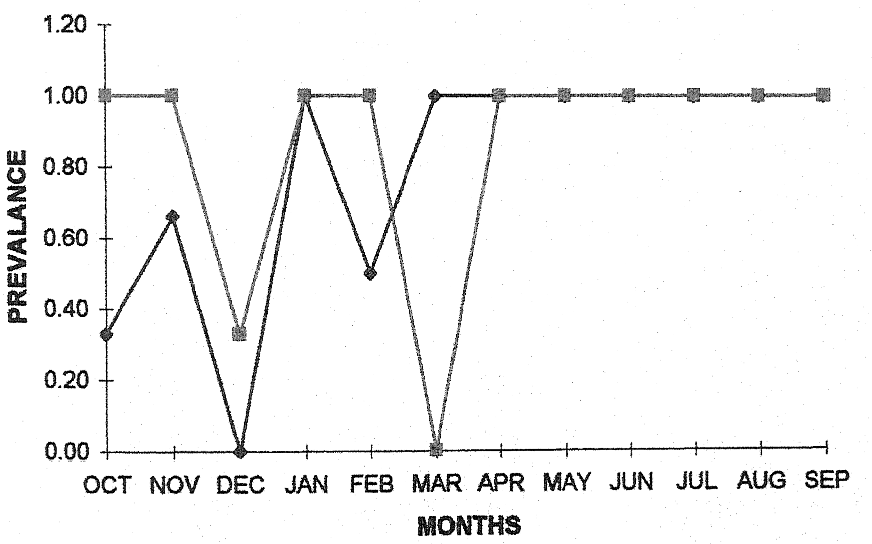


Fig 76: Monthwise variations in prevalence of helminths in *Rattus rattus*

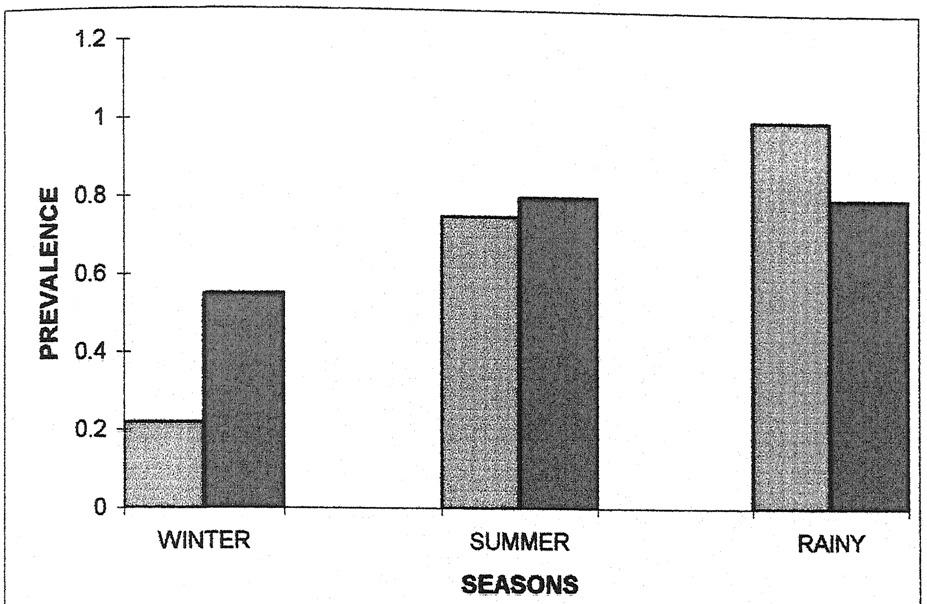


Fig 77:Seasonal variations in prevalence of cestodes in *Rattus rattus*

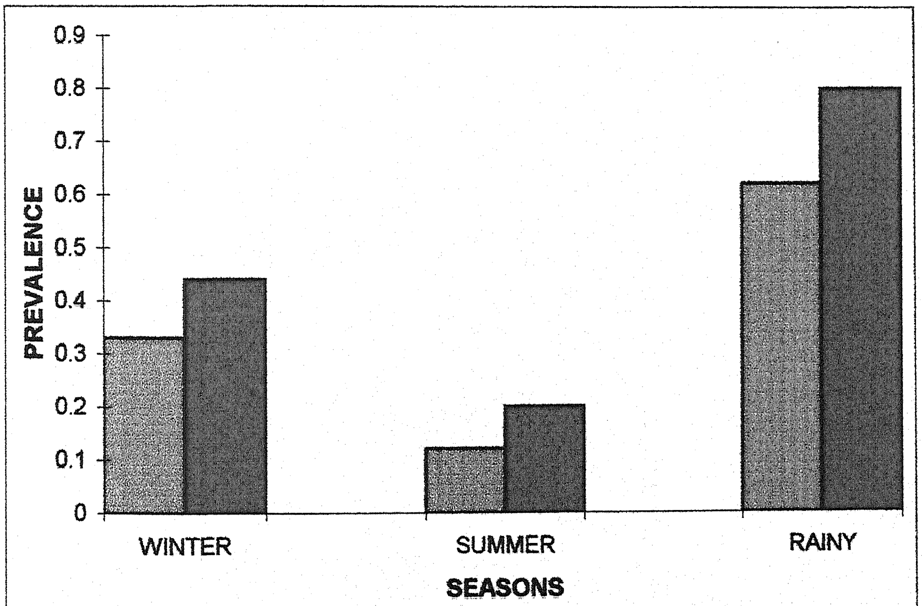


Fig 78:Seasonal variations in prevalence of nematodes in *Rattus rattus*

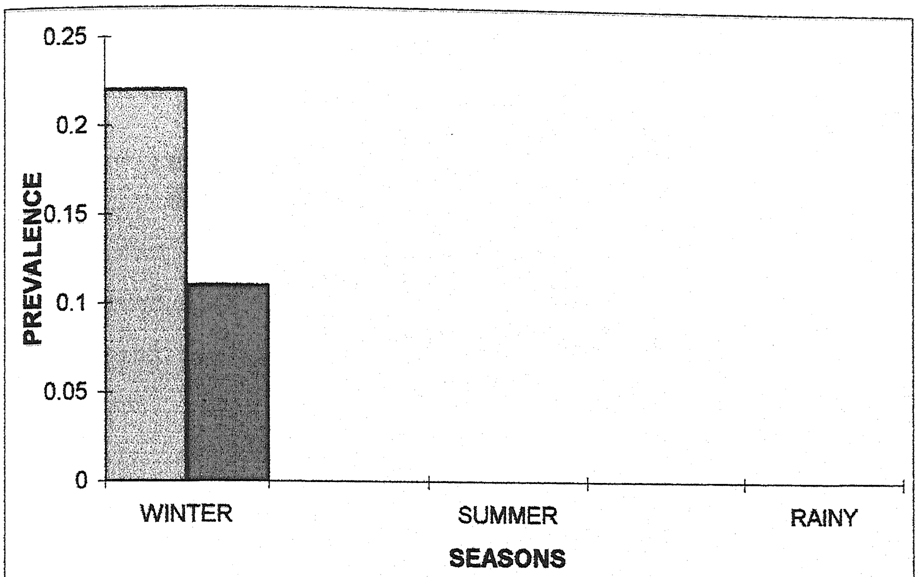


Fig 79:Seasonal variations in prevalence of acanthocephala in *Rattus rattus*

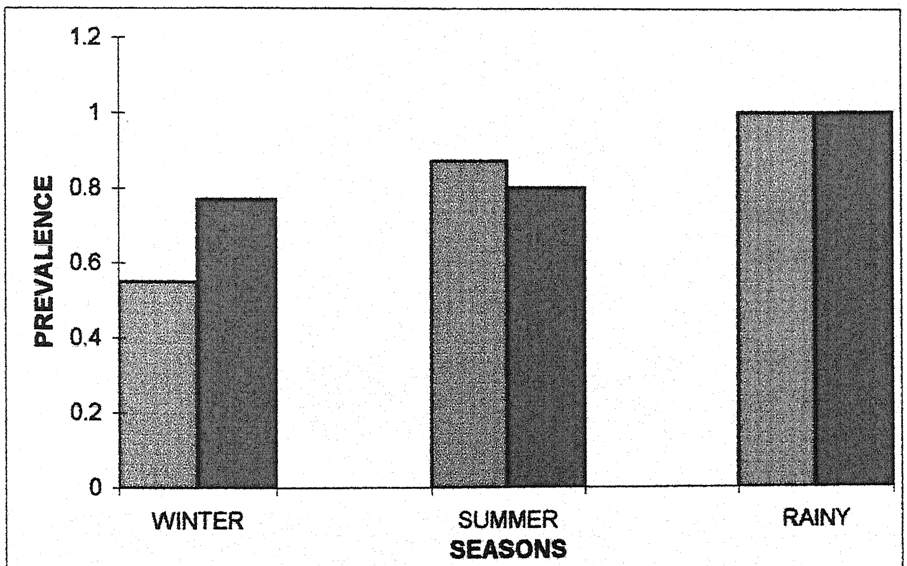


Fig 80:Seasonal variations in prevalence of helminths in *Rattus rattus*

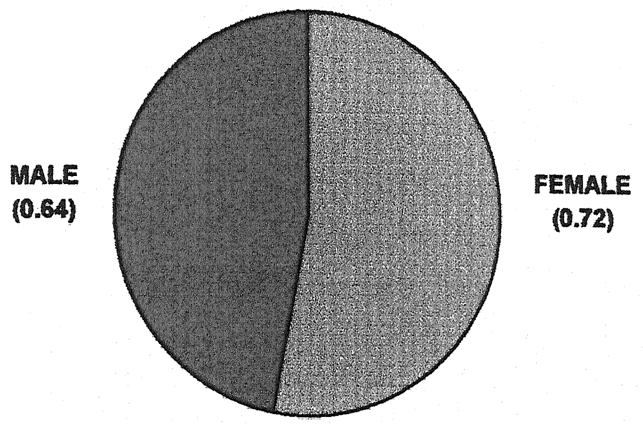


Fig 81:Annual variations in prevalence of cestodes in *Rattus rattus*

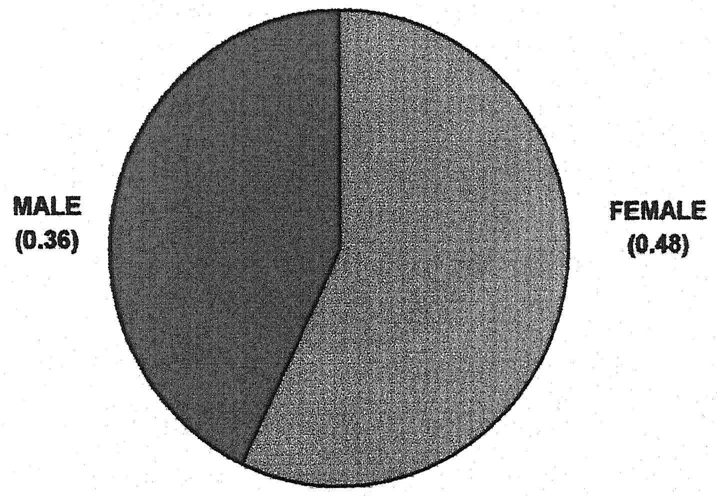


Fig 82:Annual variations in prevalence of nematodes in *Rattus rattus*

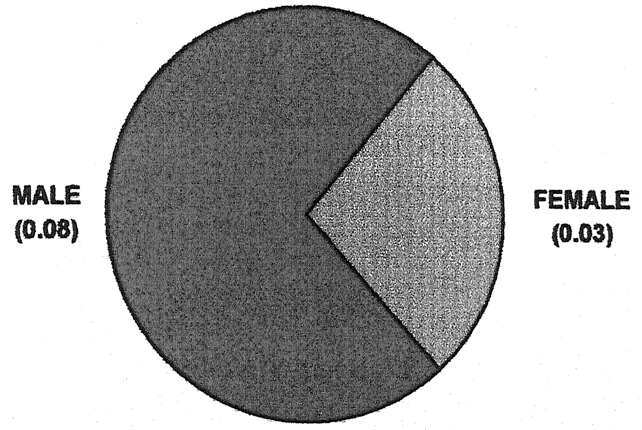


Fig 83:Annual variations in prevalence of acanthocephala in *Rattus rattus*

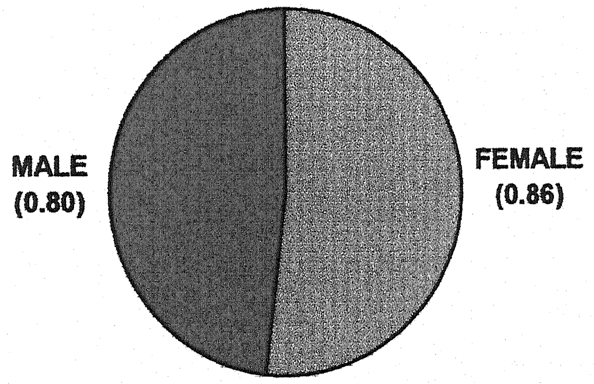


Fig 84:Annual variations in prevalence of helminths in *Rattus rattus*

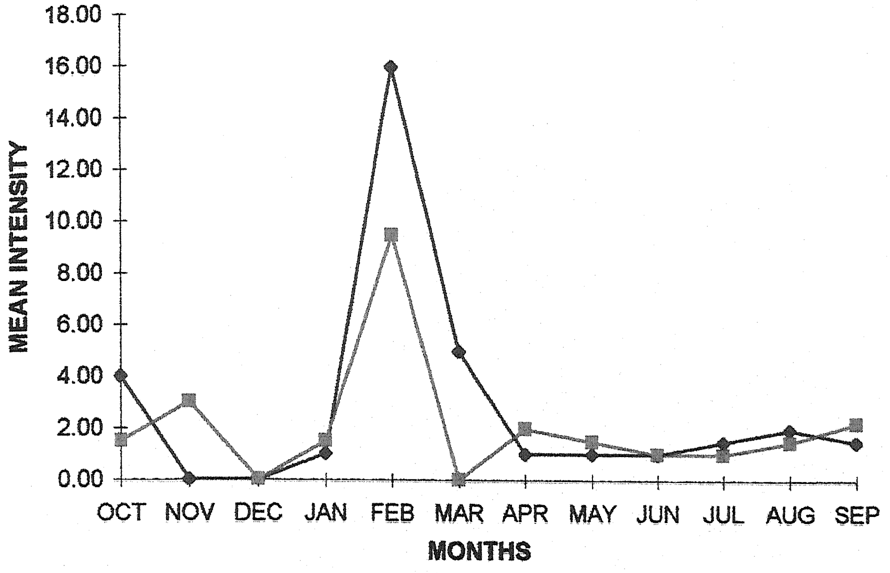


Fig 85: Monthwise variations in mean intensity of cestodes in *Rattus rattus*

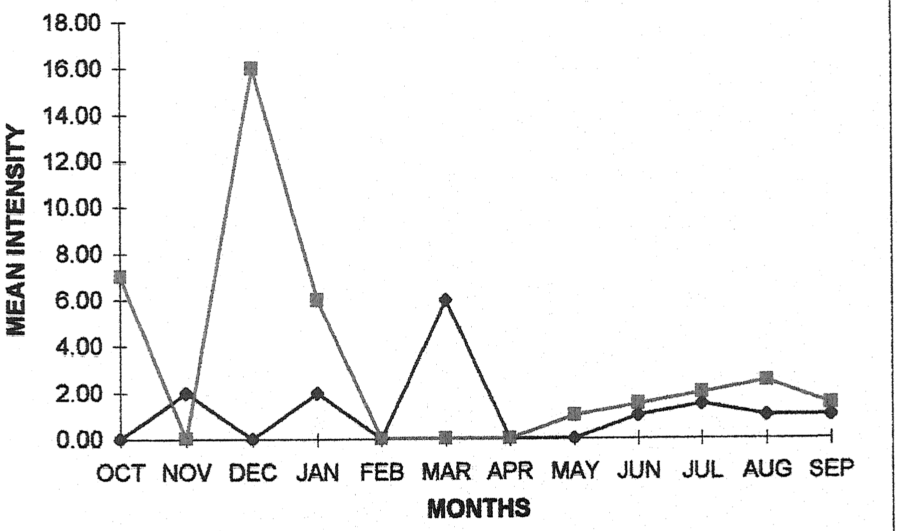


Fig 86:Monthwise variations in mean intensity of nematodes in *Rattus rattus*

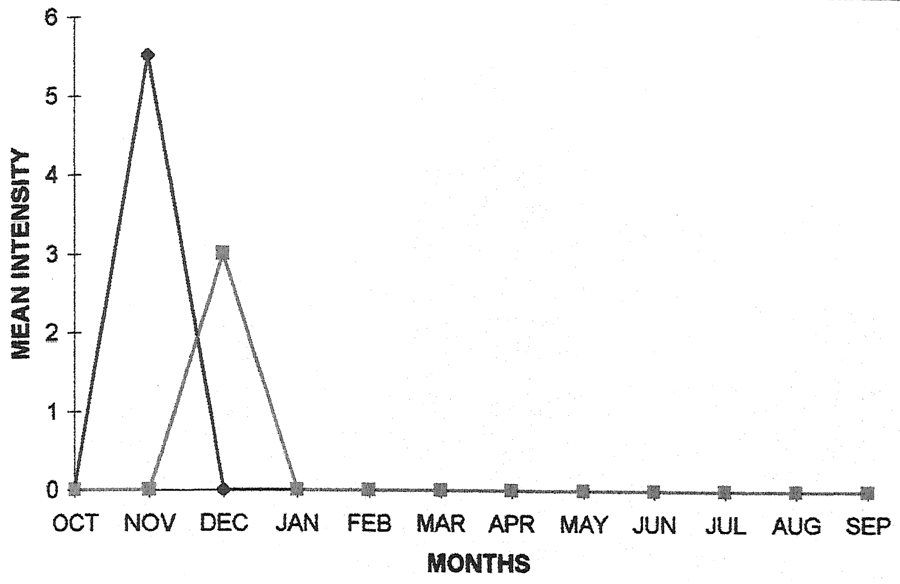


Fig 87:Monthwise variations in mean intensity of acanthocephala in *Rattus rattus*

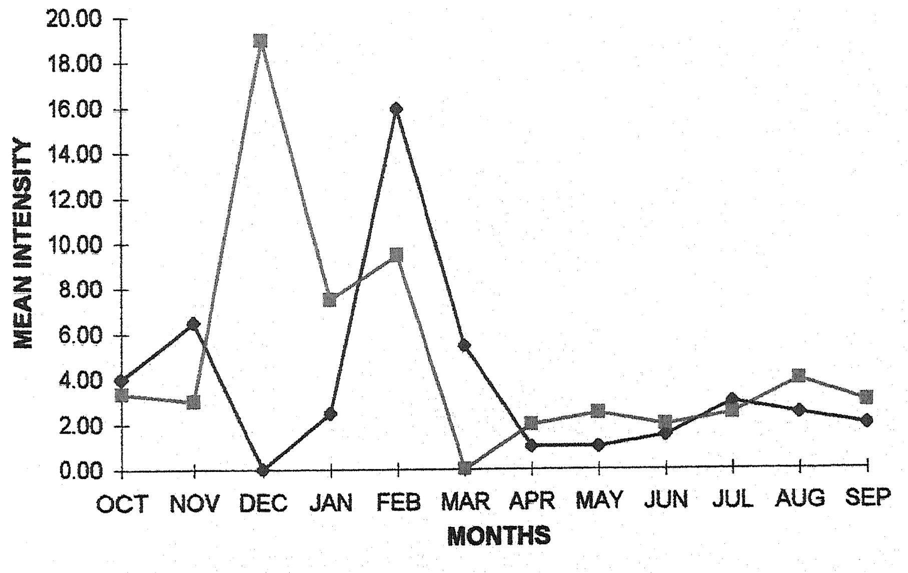


Fig 88: Monthwise variations in mean intensity of helminths in *Rattus rattus*

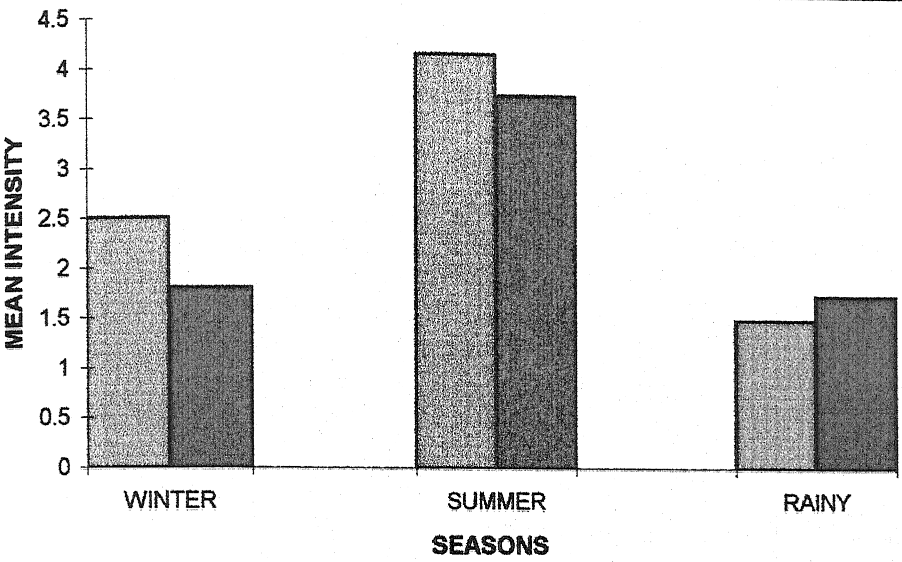


Fig 89: Seasonal variations in mean intensity of cestodes in *Rattus rattus*

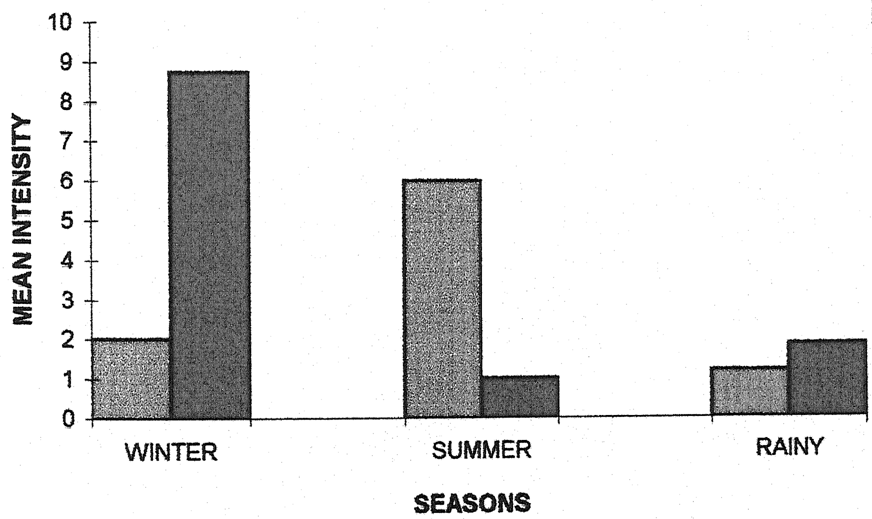


Fig 90:Seasonal variations in mean intensity of nematodes in *Rattus rattus*

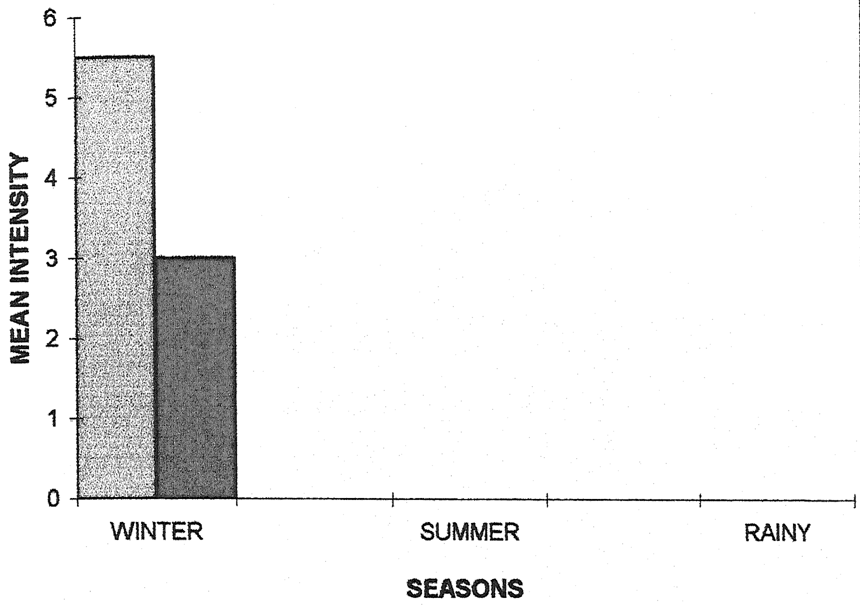


Fig 91: Seasonal variations in mean intensity of acanthocephala in *Rattus rattus*

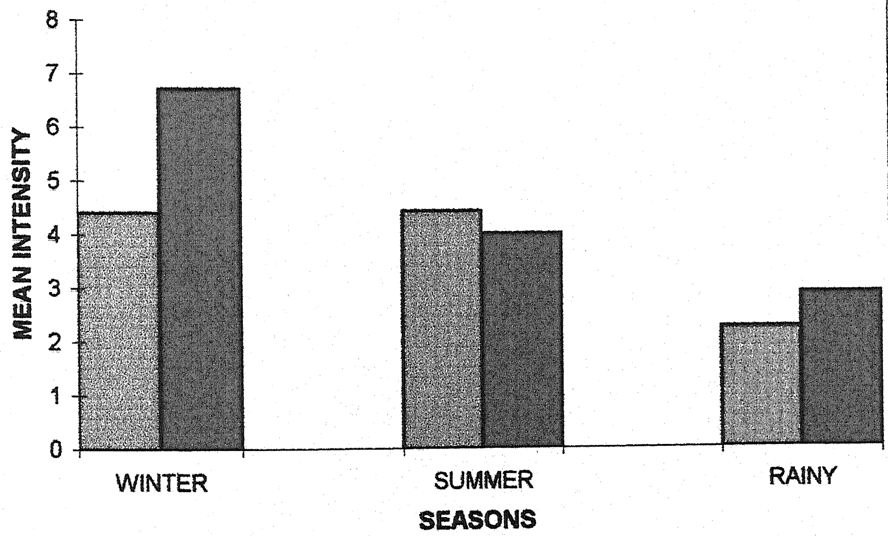


Fig 92:Seasonal variations in mean intensity of helminths in *Rattus rattus*

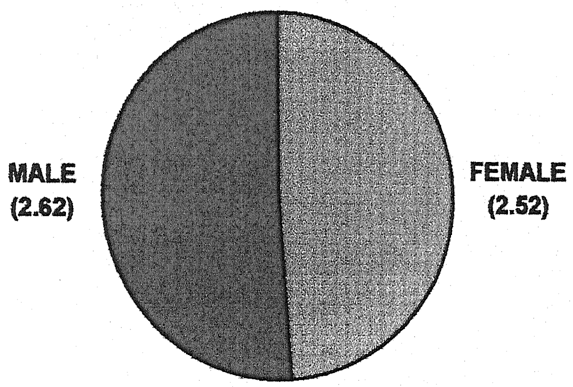
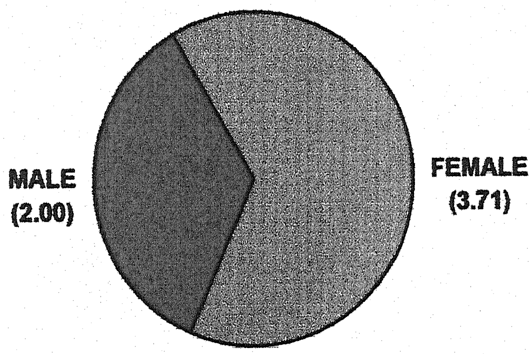


Fig 93:Annual variations in mean intensity of cestodes in *Rattus rattus*



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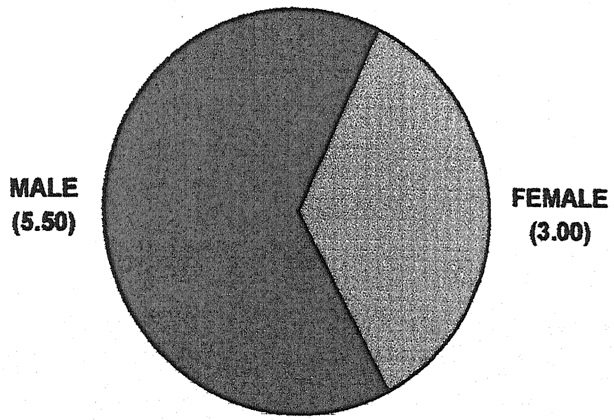

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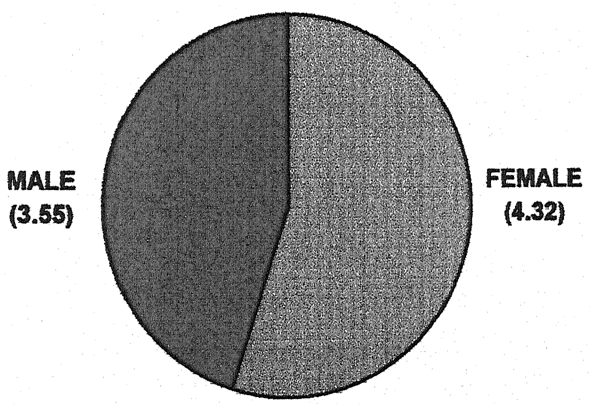
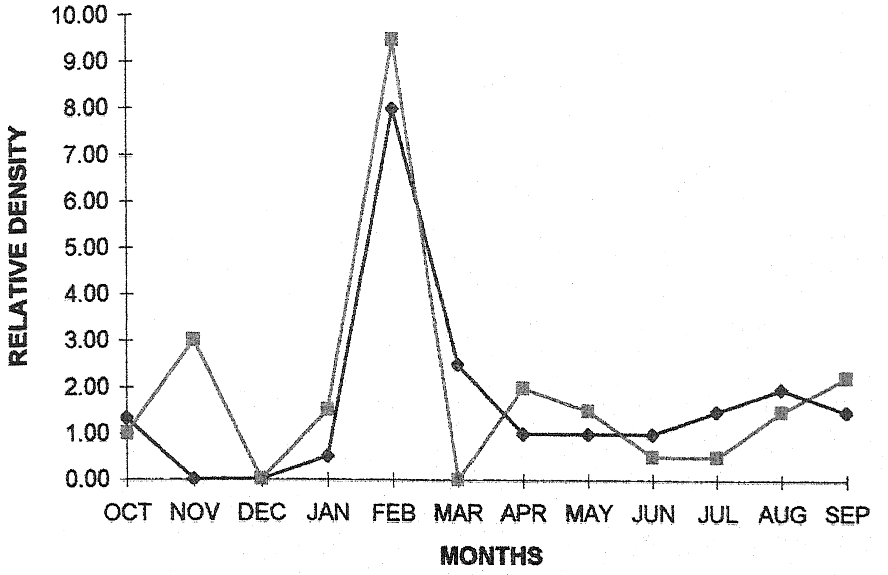


Fig 96:Annual variations in mean intensity of helminths in *Rattus rattus*



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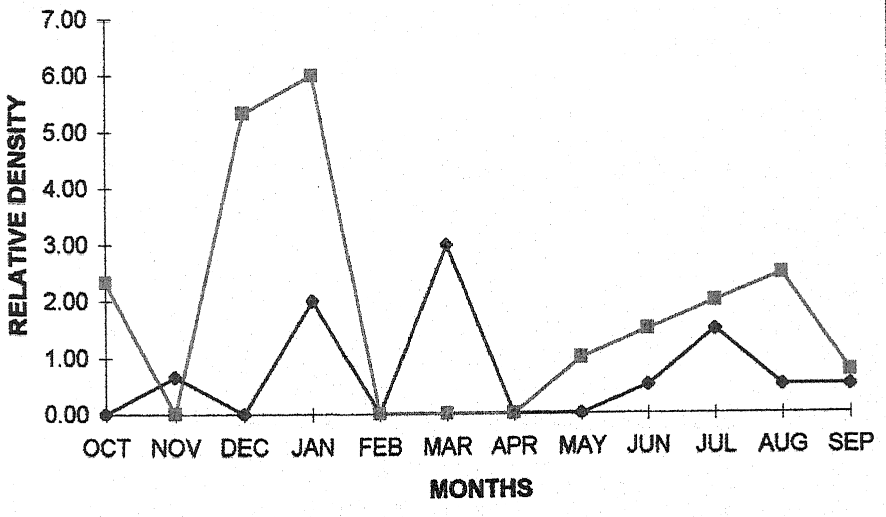

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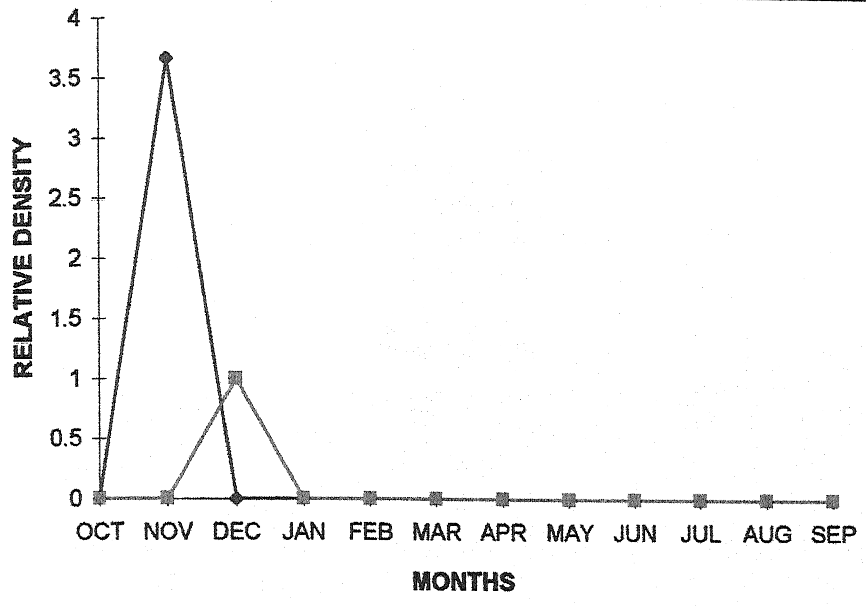

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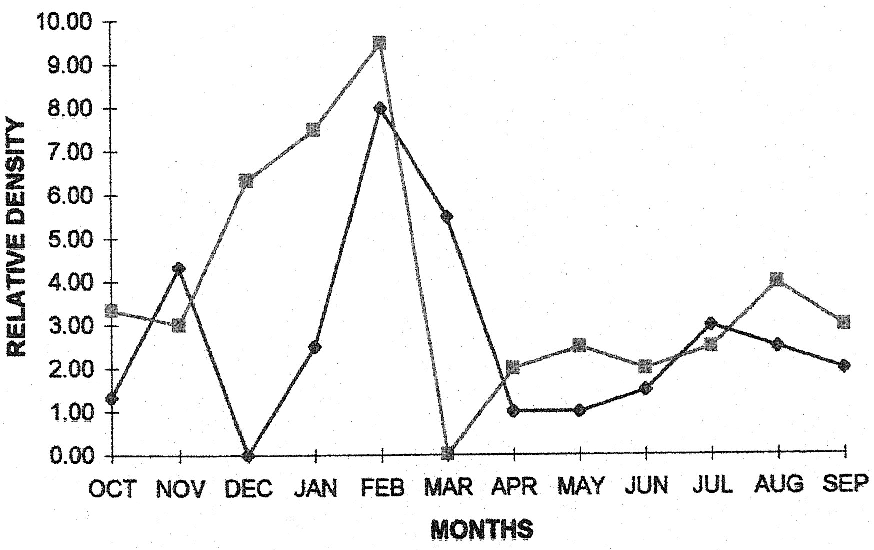


Fig 100: Monthwise variations in relative density of helminths in *Rattus rattus*

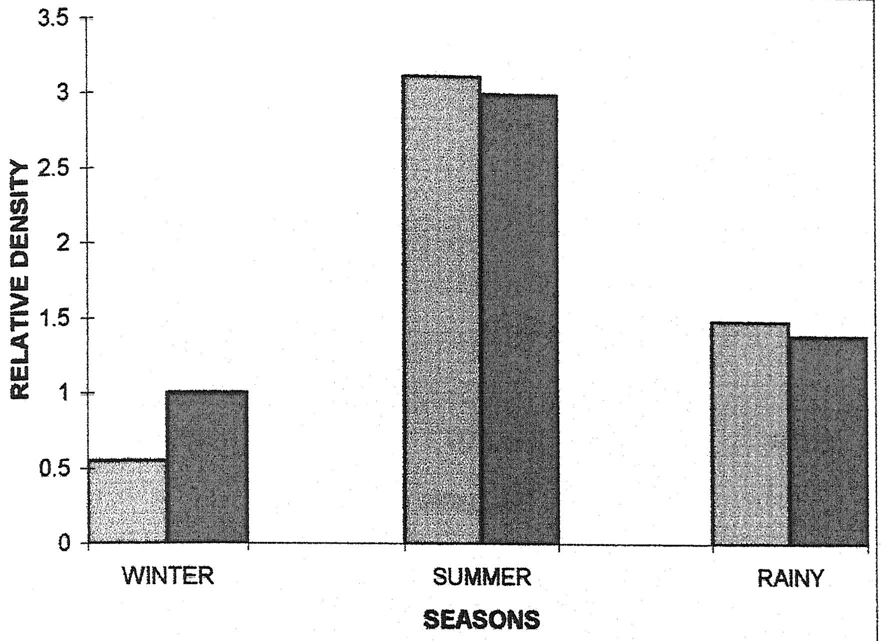


Fig 101:Seasonal variations in relative density of cestodes in *Rattus rattus*

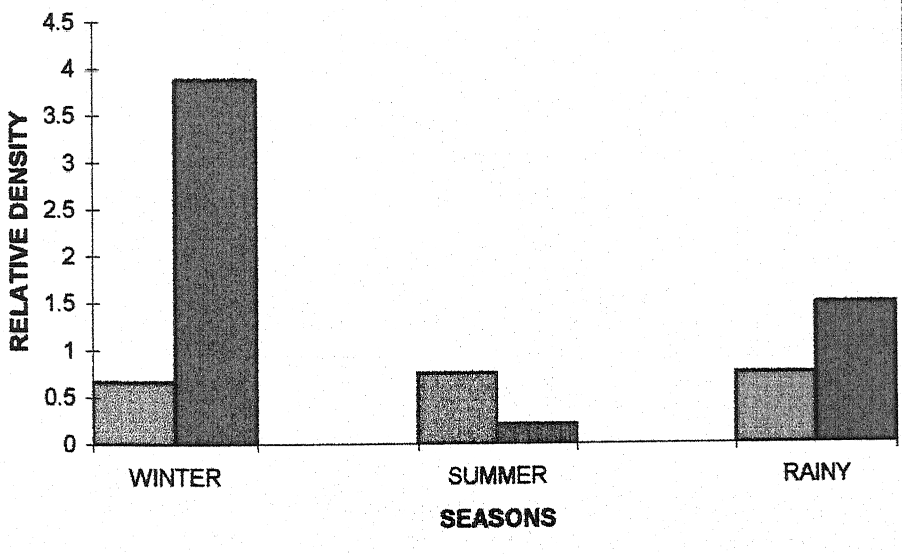


Fig 102:Seasonal variations in relative density of nematodes in *Rattus rattus*

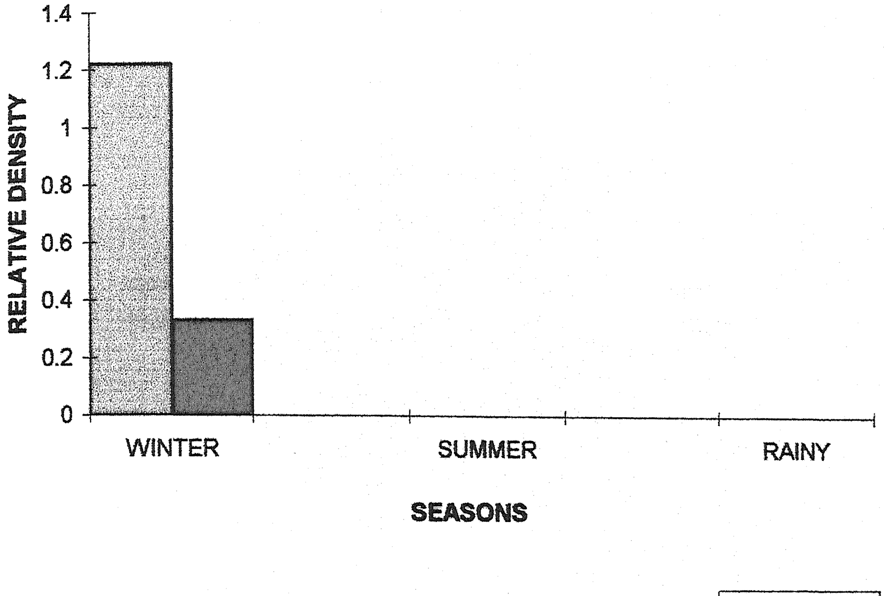


Fig 103:Seasonal variations in relative density of acanthocephala in *Rattus rattus*

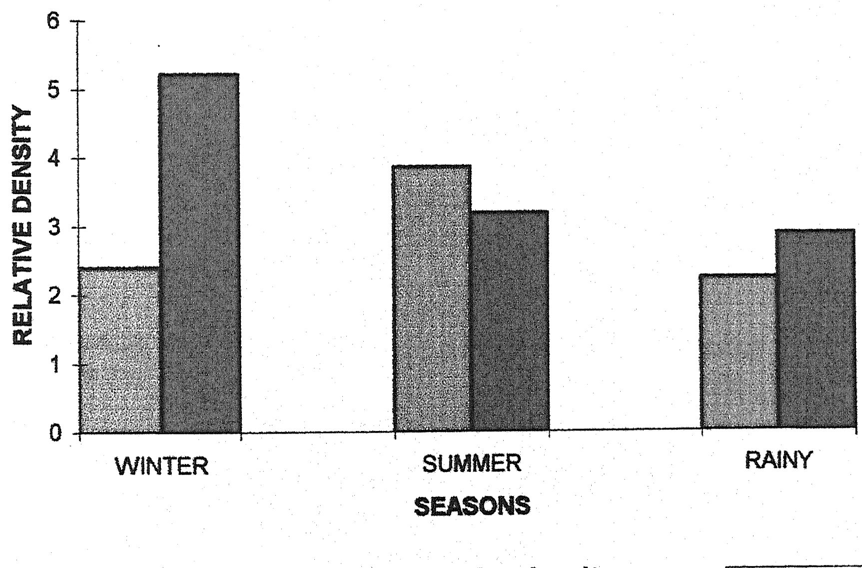


Fig 104:Seasonal variations in relative density of helminths in *Rattus rattus*

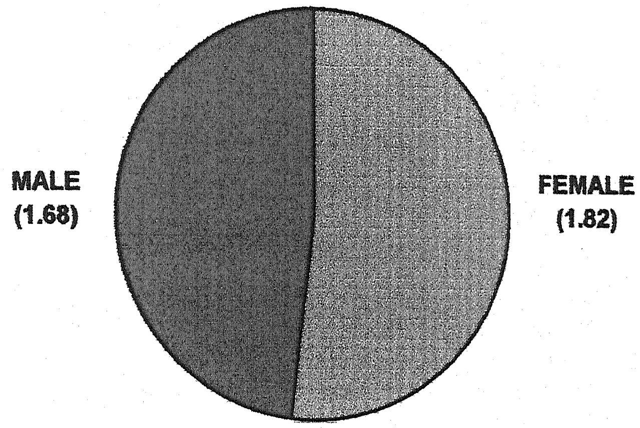


Fig 105:Annual variations in relative density of cestodes in *Rattus rattus*

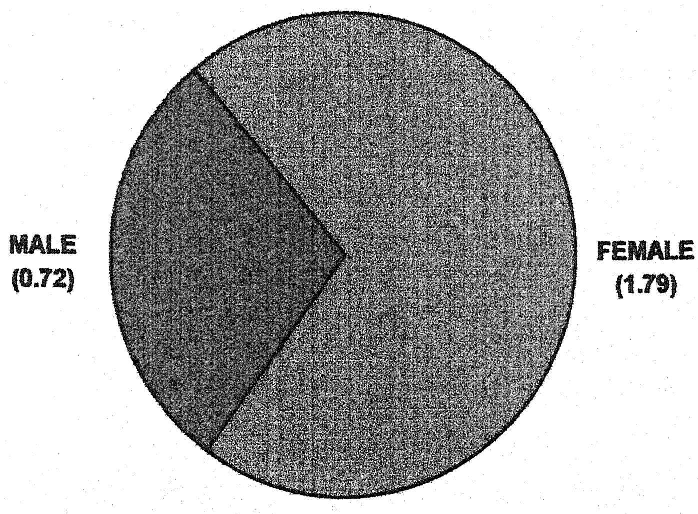
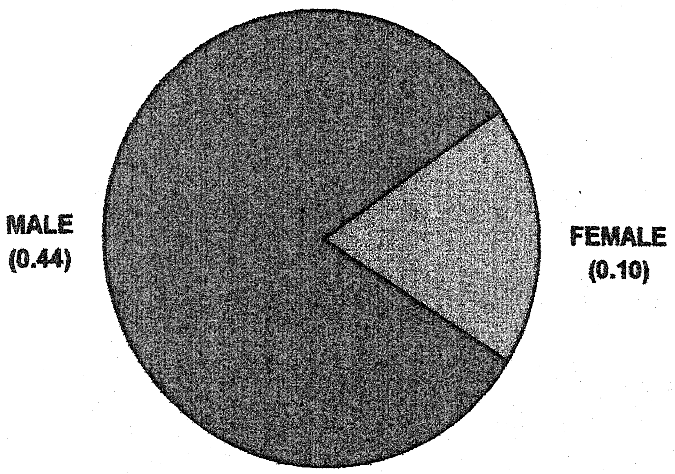


Fig 106:Annual variations in relative density of nematodes in *Rattus rattus*



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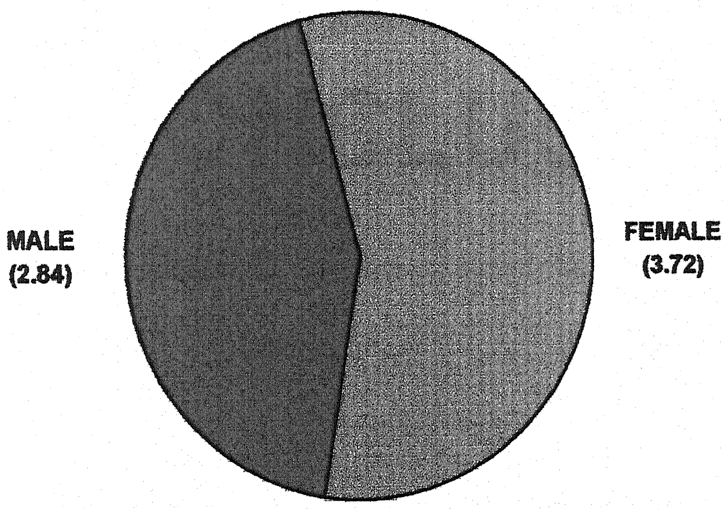

Fig 108:Annual variations in relative density of helminths in *Rattus rattus*

DISCUSSION AND CONCLUSION

The two years observations of the three amniote host species, the common wall lizard, *Hemidactylus flaviviridis* (Ruppel), the domestic fowl, *Gallus gallus* (Linnaeus) and the common rat, *Rattus rattus* (Linnaeus) reveal that they were generally infested with helminth parasites viz., cestodes, trematodes, nematodes and acanthocephala. The common wall lizard, *Hemidactylus flaviviridis* and the domestic fowl, *Gallus gallus* were infested with cestodes, trematodes and nematodes only and no acanthocephala. The common rat, *Rattus rattus* was infested with cestodes, nematodes and acanthocephala but no trematode. The domestic fowl, *Gallus gallus* was the only amniote host that showed highest helminth infestation. The acanthocephala was reported only from the common rat, *Rattus rattus.*

The observations in relation to Prevalence, Mean intensity and Relative density of cestodes, trematodes, nematodes and acanthocephala in *Hemidactylus flaviviridis*, *Gallus gallus* and *Rattus rattus* showed the following results:

Seasonal observations on Prevalence

Cestode:

In *Hemidactylus flaviviridis* the prevalence of cestodes was low in both sexes in summer and rainy seasons but it was low to moderate during winter season. In *Gallus gallus,* it was high in

both sexes in all the three seasons but varied in males in summers. In *Rattus rattus*, it was high in summer and rainy seasons in both sexes but low to moderate in winter season.

Trematode:

The prevalence of trematodes in *Hemidactylus flaviviridis* was low in summer and winter seasons but moderate in rainy season in both sexes. In *Gallus gallus*, it was low in all the three seasons in both sexes. In *Rattus rattus* it was zero in all the three seasons.

Nematode:

The prevalence of nematodes in *Hemidactylus flaviviridis* and *Gallus gallus* was high in all the three seasons in both sexes. In *Rattus rattus,* the prevalence was high in females only during rainy seasons but it was low to moderate in winter and summer seasons.

Acanthocephala:

The prevalence of acanthocephala in *Hemidactylus flaviviridis* and *Gallus gallus* was zero in all the three seasons but in *Rattus rattus* it was low in winter in both sexes and zero in summer and rainy seasons.

Thus, it appears that the prevalence of cestodes in *Hemidactylus flaviviridis* was low in summer and rainy seasons in both sexes but it was high in males during winter season. In *Gallus*

gallus, cestode infestation was high in both sexes in all the three seasons but it varied in males in summer season. In *Rattus rattus*, it was high in summer and rainy seasons in both sexes but low to moderate during winter season. The prevalence of trematodes was low to moderate in *Hemidactylus flaviviridis* and *Gallus gallus* in all the three seasons. The prevalence of nematodes was high in both sexes in all the seasons in *Hemidactylus flaviviridis* and *Gallus gallus* but it was variable in *Rattus rattus*.

The suitability of rainy seasons for the cestodes and nematodes infection might be due to the moderate temperature and more humidity that may be more suitable for the occurrence of the intermediate hosts and development of the parasite.

Seasonal observations on Mean intensity

Cestode:

The mean intensity was low in all the three seasons in both sexes in *Hemidactylus flaviviridis.* In *Gallus gallus,* it was low in all the three seasons for females. However, in males it was moderate during winter season. In *Rattus rattus* it was low in all the three seasons in both sexes.

Trematode:

In *Hemidactylus flaviviridis*, the mean intensity was low in all the three seasons in both sexes. In *Gallus gallus,* it was high in winter

and rainy seasons in females and high during winter season in males. In *Rattus rattus* it was zero in all the three seasons in both sexes.

Nematode:

The mean intensity was low in *Hemidactylus flaviviridis* in both sexes in all the three seasons. In *Gallus gallus* it was moderate in summer and low in rainy seasons in both sexes. However, it was high in females and moderate in males during winter seasons. In *Rattus rattus* it was low in all the three seasons in both sexes.

Acanthocephala:

In *Hemidactylus flaviviridis* and *Gallus gallus* the mean intensity was zero in both sexes in all the three seasons. In *Rattus rattus* it was low in winter season in both sexes and zero in summer and rainy seasons.

Thus, it appears that the mean intensity of cestodes and nematodes was low in all the three amniote hosts during rainy season. For trematodes it was low in both sexes of *Hemidactylus flaviviridis* and high in females of *Gallus gallus*.

Seasonal observations on Relative density

Cestode:

In *Hemidactylus flaviviridis* the relative density was low in both sexes in all the three seasons. In *Gallus gallus* it was low in both

sexes during summer and rainy seasons but it was low in females and moderate in males during winter season. In *Rattus rattus* it was low in both sexes in all the three seasons.

Trematode:

In *Hemidactylus flaviviridis* it was low in both sexes in all the three seasons. In *Gallus gallus* it was low in both sexes during summer and rainy seasons but moderate in both sexes during winter season. In *Rattus rattus* it was zero in all the three seasons in both sexes.

Nematode:

In *Hemidactylus flaviviridis* it was low in all the three seasons in both sexes. In *Gallus gallus* it was moderate in both sexes during summer season, high in females during winter season and low in both sexes during rainy season. In *Rattus rattus* it was low in both sexes in all the three seasons.

Acanthocephala:

The relative density was zero in both sexes of *Hemidactylus flaviviridis* and *Gallus gallus* in all the three seasons. In *Rattus rattus* it was low in winter seasons in both sexes but it was zero in summer and rainy seasons.

Thus, it appears that relative density of cestodes, trematodes and nematodes was low during rainy season in all the three amniote hosts.

From the above discussion it can be concluded that during rainy season the prevalence of the three kinds of parasites was high but the mean intensity and relative density of the three kinds of parasites were low. Thus for rainy season the prevalence of the parasites appears to be inversely proportional to their mean intensity and relative density.

Annual Observations of Prevalence, Mean intensity and Relative density

On the basis of annual variations of prevalence, mean intensity and relative density of cestodes, trematodes, nematodes and acanthocephala in *Hemidactylus flaviviridis*, *Gallus gallus* and *Rattus rattus*, the following conclusions can be deduced.

Prevalence:

The prevalence of cestode infection was more in males of *Hemidactylus flaviviridis* and in females of *Gallus gallus* and *Rattus rattus*. The prevalence of trematode infection was more in females of *Hemidactylus flaviviridis* and *Gallus gallus*. The prevalence of nematode infection was more in males of *Hemidactylus flaviviridis* and *Gallus gallus* but in *Rattus rattus* it was more in the females.

The prevalence of acanthocephala infection was more in males of *Rattus rattus.*

Mean intensity:

The mean intensity of the cestode, trematode and nematode infection was higher in females in all the three amniote hosts except the cestode infection in *Gallus gallus* and *Rattus rattus* where it was higher in males. The mean intensity of acanthocephala infection was higher in males of *Rattus rattus.*

Relative density:

The relative density of cestode infection was higher in males of *Hemidactylus flaviviridis* and *Gallus gallus* and in females of *Rattus rattus*. The relative density of trematode infection was higher in females of *Hemidactylus flaviviridis* and *Gallus gallus*. The relative density of nematode infection was higher in males of *Hemidactylus flaviviridis* but in females of *Gallus gallus* and *Rattus rattus*. The relative density of acanthocephala infection was higher in males of *Rattus rattus.*

It appears that the infection of parasite in male or female individual was dependent on the individual immunity of the host. Hormonal activity and the sexual status do not play any important role.

EXPLANATION
OF
PLATES

Explanation of plates - Morphotaxonomy of Cestodes.

PLATE: 1. *Raillietina (Paroniella) culiauana* (Tubangui *et.* Masilungan, 1937).

Figure

a. Scolex with neck (6x10)

b. Rostellar hook (12 x 100)

c. Mature proglottid (1 x 10)

d. T.S. of mature proglottid showing extension of cirrus pouch (6 x 45)

e. Gravid proglottid (1 x 10)

PLATE: 2. *Raillietina (Skrjabinia) francoliana* n. sp.

Figure

a. Scolex with neck (5 x 45)

b. Rostellar hook (15 x 45)

c. Mature proglottid (5 x 45)

d. Gravid proglottid (5 x 10)

e. Egg capsule (10 x 45)

PLATE: 3. *Raillietina (Skrjabinia) jagdishei* n. sp.

Figure

a. Scolex with neck (12 x 10)

b. Rostellar hook (12 x 100)

c. Mature proglottid (12 x 10)

d. T.S. of mature proglottid showing extension of cirrus pouch (12 x 45)

e. Gravid proglottid (12 x 10)

PLATE: 4. *Raillietina (Raillietina) lalitpurensis* n. sp.

Figure

a. Scolex with neck (5 x 45)

b. Rostellar hook (10 x 100)

c. Mature proglottid (5 x 45)

d. Gravid proglottid (10 x 10)

e. Egg capsule (10 x 45)

PLATE: 5. *Raillietina (Raillietina) tetragona* (Molin, 1858).

Figure

a. Scolex with neck (5 x 45)

b. Rostellar hook (10 x 100)

c. Mature proglottid (10 x 10)

d. Gravid proglottid (5 x 10)

e. Egg capsule (5 x 45)

PLATE: 6. *Raillietina (Führmannetta) baruasagari* n. sp.

Figure

a. Scolex with neck (12 x 45)

b. Rostellar hook (12 x 100)

c. Mature proglottid (12 x 10)

d. Gravid proglottid (12 x 10)

PLATE: 7. *Raillietina (Führmannetta) jhansiensis* n. sp.

Figure

a. Scolex with neck (12 x 10)

b. Rostellar hook (12 x 100)

c. Mature proglottid (12 x 10)

d. Gravid proglottid (6 x 10)

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List of Ecological graphs

Common Wall Lizard, *Hemidactylus flaviviridis* (Ruppel)

Domestic Fowl, *Gallus gallus* (Linnaeus)

Common Rat, *Rattus rattus* (Linnaeus)

ABBREVIATIONS

ABBREVIATIONS

CP	:	Cirrus pouch
DLEC	:	Dorsal longitudinal excretory canal
E	:	Egg
EC	:	Egg capsule
EVS	:	External vesicula seminalis
G	:	Gland
GA	:	Genital atrium
GP	:	Genital pore
IVS	:	Internal vesicula seminalis
MG	:	Mehli's gland
N	:	Neck
O	:	Ovary
ON	:	Onchosphere
R	:	Rostellum
RH	:	Rostellar hook
RS	:	Receptaculum seminis
S	:	Sucker
SC	:	Scolex
SS	:	Sucker spine
T	:	Testes
TEC	:	Transverse excretory canal
V	:	Vagina
VD	:	Vas deferens
VG	:	Vitelline gland
VLEC	:	Ventral longitudinal excretory canal

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